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Surfwater+Sed
5/19/92

Kennedy/Jenks Consultants

South Tacoma Field
Superfund Site
Tacoma, WA

Surface Water and Sediment Investigation Report

APPENDICES

K/J Project No. 916055.10
Draft Report

SURFACE WATER AND SEDIMENT INVESTIGATION REPORT APPENDICES

SOUTH TACOMA FIELD SUPERFUND SITE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY

DRAFT REPORT

Prepared for

SOUTH TACOMA FIELD SITE GROUP

Prepared by

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K/J 916055.10/24

19 May 1992

LIST OF APPENDICES

APPENDIX SW-A

MONTHLY PRECIPITATION DATA

PRECIPITATION DATA
FOR THE MONTH OF APRIL 1991

Day	Daily Precipitation (inches)	Storm Event			
		Start Time	End Time	Duration (hours)	Total Precipitation (inches)
1	Trace				
2[a]	0.52	0350	1550	12	0.52
3	1.33	0000	--		
4[b]	3.39	--	--		
5	0.59	--	1550	63.8	5.31
6	0.13	0350	2150	18	0.13
7	0.06	0350	2150	18	0.06
8	0.57	950			
9	0.08		0350	18	0.64
10	0.18	2150 (4/9)	950	12	0.19
11	0				
12	0				
13	0				
14	0.01	1550	2150	6	0.01
15	Trace				
16	0				
17	0				
18	0				
19	0				
20	0				
21	0				
22	0				
23	0.41	0950	2400	17.8	0.41
24	0.16	0950	2150	12	0.16
25	0.06	0950	2150	12	0.06
26	0.04	0950	1550	6	0.04
27	0				
28	0.06	0350	0950	6	0.06
29	0.02	0000	0350	3.8	0.02
30[c]	0				
Total Monthly Precipitation	7.61				

(a) Stormwater runon samples collected at Locations 2500 and 2501.
(b) Biweekly runoff sample collected at Location 2515; and monthly runon samples collected at Locations 2500 and 2501.
(c) Monthly runon samples collected at Locations 2500 and 2501.

PRECIPITATION DATA
FOR THE MONTH OF MAY 1991

Day	Daily Precipitation (inches)	Storm Event			
		Start Time	End Time	Duration (hours)	Total Precipitation (inches)
1	0				
2	0				
3	0				
4	0				
5	0.05	0350	2150	18	0.05
6	0.08	0350	2150	18	0.08
7	0.59	0350	2150	18	0.59
8	0.12	0350	1550	12	0.12
9	Trace				
10	0				
11	0				
12	Trace				
13	Trace				
14	Trace				
15	0				
16	Trace				
17	0.24	0000			
18	0.13		1550	39.8	0.37
19	0.01	0000	0350	3.8	0.01
20	0				
21	Trace				
22	0				
23	0.02	2150			
24[a]	0.38		1550	18	0.40
25	0.03	0000	0950	9.8	0.03
26	Trace				
27	0				
28	0				
29[b]	0.25	0950	2150	12	0.25
30	0				
31	0				
Total Monthly Precipitation	1.9				

(a) Stormwater runon samples collected at Locations 2500 and 2501.
(b) Monthly runon samples collected at Locations 2500 and 2501.

PRECIPITATION DATA
FOR THE MONTH OF JUNE 1991

Day	Daily Precipitation (inches)	Storm Event			
		Start Time	End Time	Duration (hours)	Total Precipitation (inches)
1	0				
2	0				
3	0				
4	0				
5	0				
6	Trace				
7	0.09	0950	1550	6	0.09
8	Trace				
9	0				
10	Trace				
11	Trace				
12	0.10	0000	1550	15.8	0.10
13	0.29	0350	2150	18	0.29
14	Trace				
15	0.12	0950	2400	14.2	0.12
16	0.05	0350	1550	12	0.05
17	0				
18	0				
19	Trace				
20	0.87	0000	1550	15.8	0.87
21	0				
22	Trace				
23	0				
24	0				
25[a]	0				
26	0				
27	0				
28	0				
29	0.18	0350	1550	12	0.18
30	Trace				
Total Monthly Precipitation	1.7				

(a) Monthly runon samples collected at Locations 2500 and 2501.

PRECIPITATION DATA
FOR THE MONTH OF JULY 1991

Day	Daily Precipitation (inches)	Storm Event			
		Start Time	End Time	Duration (hours)	Total Precipitation (inches)
1	0				
2	0				
3	0				
4	0				
5	0				
6	0				
7	0				
8	0				
9	0				
10	0				
11	0				
12	0				
13	Trace				
14	0.02	2150	2400	2.2	0.02
15	Trace				
16	Trace				
17	0				
18	0				
19	0				
20	0				
21	0.02	2150	2400	2.2	0.02
22	0				
23	0				
24[a]	0.20	0950	1550	6	0.20
25	Trace				
26	0				
27	0				
28	0				
29	0				
30	0				
31	Trace				
Total Monthly Precipitation	0.24				

(a) Stormwater runon samples collected at Locations 2500 and 2501.

PRECIPITATION DATA
FOR THE MONTH OF AUGUST 1991

Day	Daily Precipitation (inches)	Storm Event			
		Start Time	End Time	Duration (hours)	Total Precipitation (inches)
1	Trace				
2	0				
3	0				
4	0				
5	0				
6	0.03	2150	2400	2.2	0.03
7	Trace				
8	0				
9[a]	0.99	0000	1550	15.8	0.99
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
16	0				
17	0				
18	0				
19	0				
20	0				
21	0				
22[b]	0				
23	0				
24	0				
25	0				
26	0				
27	0.46	0000	1550	15.8	0.46
28	0.35	0950	–		
29	0.01	–	0350	18	0.36
30	0				
31	0.55	0350	0350(9/1)	24	0.56
Total Monthly Precipitation	2.39				

(a) Stormwater runon samples collected at Locations 2500 and 2501.
(b) Monthly runon sample collected at Location 2500 only (no flow at Location 2501).

PRECIPITATION DATA
FOR THE MONTH OF SEPTEMBER 1991

Day	Daily Precipitation (inches)	Storm Event			
		Start Time	End Time	Duration (hours)	Total Precipitation (inches)
8/31 - 9/1	0.01	0350(8/31)	0350	24	0.58
2	0				
3	0				
4	0				
5	0				
6	0				
7	Trace				
8	0				
9	0				
10	0				
11	0				
12	Trace				
13	0.01	0000	0350	3.8	0.01
14	0				
15	0				
16	0				
17	0				
18	0				
19	0				
20	0				
21	0				
22	0				
23	0				
24	0				
25	0				
26	Trace				
27	0				
28	0				
29	0				
30	0				
Total Monthly Precipitation	0.02				

PRECIPITATION DATA
FOR THE MONTH OF OCTOBER 1991

Day	Daily Precipitation (inches)	Storm Event			
		Start Time	End Time	Duration (hours)	Total Precipitation (inches)
1	0				
2	0				
3	0				
4	0				
5	0				
6	0				
7	0				
8	0				
9	0				
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
16[a]	0.38	0350	1550	12	0.38
17	0				
18	0				
19	0				
20	0				
21	0.02	0350	0950	6	0.02
22[b]	0.89	0000	2150	21.8	0.89
23	0.01	2150	–		
24	0.46	–	0950	12	0.47
25	0.22	0350	2150	18	0.22
26	0				
27	0				
28	0.14	0950	2150	12	0.14
29	0				
30	0				
31	0.01	1550	2150	6	0.01
Total Monthly Precipitation	2.13				

(a) Monthly runon samples collected at Locations 2500 and 2501.
(b) Stormwater runon samples collected at Locations 2500 and 2501.

PRECIPITATION DATA
FOR THE MONTH OF NOVEMBER 1991

Day	Daily Precipitation (inches)	Storm Event			
		Start Time	End Time	Duration (hours)	Total Precipitation (inches)
1	0.01	1550	2150	6	0.01
2	0				
3	0.02	1550	2150	6	0.02
4	0.37	0000	—		
5	0.63	—	0950	38.8	1.02
6	0				
7	0.17	0000	0950	9.8	0.17
8	0.34	0350	0950	6	0.34
9	0.18	1550	2150	6	0.18
10	0.01	0000	0350	3.8	0.01
11[a]	0.65	0000	2150	21.8	0.65
12	0.04	0950	1550	6	0.04
13	0.10	0000	2150	21.8	0.10
14[b]	Trace				
15	Trace				
16	0.45	0350	—		
17	0.23	—	2150	42	0.68
18	0.01	1550			
19	0.64		2150	30	0.65
20	0.76	0350	2400	20.02	0.76
21	0.01	0350	0950	6	0.01
22	0				
23	0.19	0350	—		
24	0.91	—	—		
25	0.36	—	2150	66	1.27
26	0.44	0350	—		
27[c]	0.02	—	0350	24	0.46
28	0.10	1550	2150	6	0.10
29	0				
30	Trace				
Total Monthly Precipitation	6.64				

(a) Stormwater runon samples collected at Locations 2500 and 2501.
(b) Monthly runon samples collected at Location 2500 and 2501.
(c) Biweekly runoff sample collected at Location 2515.

PRECIPITATION DATA
FOR THE MONTH OF DECEMBER 1991

Day	Daily Precipitation (inches)	Storm Event			
		Start Time	End Time	Duration (hours)	Total Precipitation (inches)
1	0.05	0950	1550	6	0.05
2	0				
3	0				
4	0.10	0000	0950	9.8	0.10
5	0.83	0000	2150	21.8	0.83
6	0.33	0950	–		
7	–	–	0350	15	0.33
7	0.03	1550	2150	6	0.03
8	Trace				
9	0.10	0350	0950	6	0.10
10	0.01	2150	–		
11	0.03	–	0950	21	0.03
11	–	2150	–		
12[a]	0.12	–	1550	18	0.13
13	0				
14	0				
15	0				
16	0				
17	0				
18[b]	0.38	0000	0950	9.8	0.38
19	0.04	0350	0950	6	0.04
20	0.08	1550	–		
21	0.26	–	2150	30	0.34
22	Trace				
23	0.01	0000	0350	3.8	0.01
24	0.06	0350	–		
25	0.06	–	2150	42	0.12
26	0.09	1550	–		
27	0.19	–	1550	24	0.28
28	0.09	0950	2150	12	0.09
29	0.02	1550	–		
30	0.10	–	0950	15	0.12
31	0				
Total Monthly Precipitation	2.98				

(a) Monthly runon samples collected at Locations 2500 and 2501.
(b) Stormwater runon samples collected at Locations 2500 and 2501.

PRECIPITATION DATA
FOR THE MONTH OF JANUARY 1992

Day	Daily Precipitation (inches)	Storm Event			
		Start Time	End Time	Duration (hours)	Total Precipitation (inches)
1	0.29	0950	–		
2	0.21	–	0950	24	0.50
3	0.06	0350	1550	12	0.06
4	0.19	0000	0950	9.8	0.19
5	0.07	0950	2150	12	0.07
6	Trace				
7	0				
8	0				
9	0.01	1550	2150	6	0.01
10	0.33	0350	2150	18	0.33
11	0				
12	Trace				
13	Trace				
14	0.02	0350	0950	6	0.02
15	0.02	1550	–		
16	0.44	–	0950	18	0.46
17[a]	0				
18	0				
19	0				
20	0.03	1550	–		
21	0.11	–	0350	12	0.14
22	0.28	1550	–		
23[b]	0.95		2150	32	1.23
24	0.02	0000	0350	3.8	0.02
25	0.22	0950	1550	6	0.22
26	0.10	0950	–		
27	1.30	–	–		
28[c]	0.79	–	–		
29	0.17	–	0950	96	2.38
30	0.81	0000	–		
1/31-2/1	0.71	–	1550 (2/1/92)	63.8	1.61
Total Monthly Precipitation	7.13				

(a) Monthly runon samples collected at Locations 2500 and 2501.
(b) Stormwater runon samples collected at Locations 2500 and 2501.
(c) Stormwater runoff sample collected at Location 2515.

PRECIPITATION DATA
FOR THE MONTH OF FEBRUARY 1992

Day	Daily Precipitation (inches)	Storm Event			
		Start Time	End Time	Duration (hours)	Total Precipitation (inches)
1/30-2/1	0.09	0000(1/30/92)	1550	63.8	1.61
2	0.27	0000	1550	15.8	0.27
3[a]	0				
4	0				
5	0				
6[b]	Trace				
7	0.28	0950	–		
8	0.15	–	0950	24	0.43
9	0.06	0000	0950	9.8	0.06
10	Trace				
11	Trace				
12	Trace				
13[c]	0.15	0000	2150	21.8	0.15
14	0.56	1550	–		
15	0.41	–	0350	9	0.97
16	0				
17	0.09	0350	2150	18	0.09
18[c]	0.32	0000	2150	21.8	0.32
19[a]	0.28	1550	–		
20	0.45	–	1550	24	0.73
21	0.87	0000	–		
22	0.31	–	0950	33.8	1.18
23	0.20	0950	2150	12	0.20
24	0.03	0350	0950	6	0.03
25	0				
26	0				
27	0				
28	0				
29	0.02	1550	2150	6	0.02
Total Monthly Precipitation	4.54				

(a) Biweekly runoff sample collected at Location 2515.
(b) Monthly runon samples collected at Locations 2500 and 2501.
(c) Stormwater runon samples collected at Locations 2500 and 2501.

PRECIPITATION DATA
FOR THE MONTH OF MARCH 1992

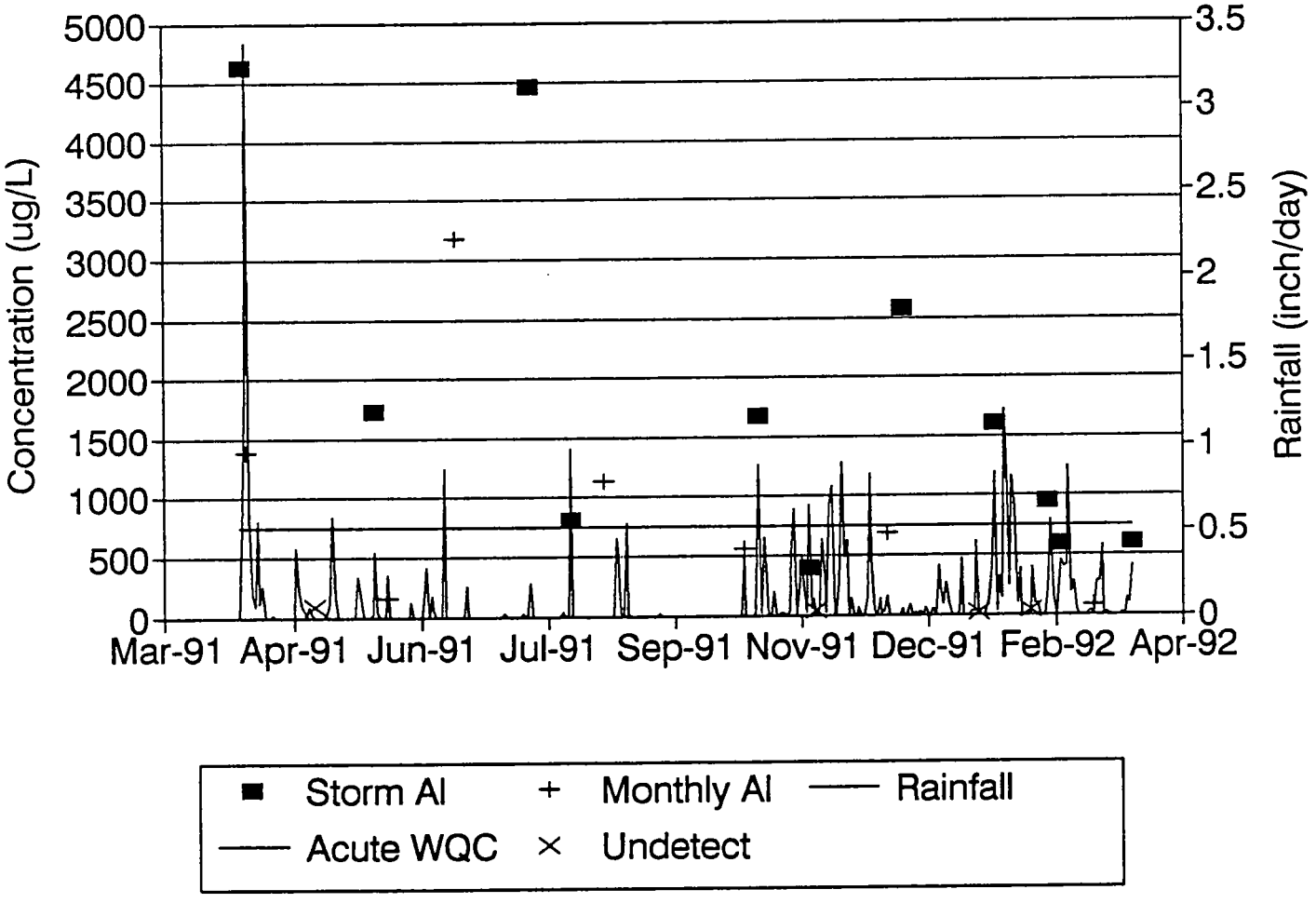
Day	Daily Precipitation (inches)	Storm Event			
		Start Time	End Time	Duration (hours)	Total Precipitation (inches)
1	0.02	0950	2150	12	0.02
2[a]	0				
3	0.20	0350	1550	12	0.20
4	0.20	0350	–		
5	–	–	0350	24	0.20
5	0.47	0950	–		
6	0.03	–	0350	18	0.38
7	0.01	0000	0350	3.8	0.01
8	0				
9	0				
10	0				
11	0				
12	0				
13	0.01	1550	2150	6	0.01
14	Trace				
15	0.10	0000	0350	3.8	0.10
16	0.07	0950	2150	12	0.07
17	0.29	0000	1550	15.8	0.29
18	0				
19	0				
20	0				
21	0				
22	0				
23	0				
24	0				
25	Trace				
26	0.03	0000	0350	3.8	0.03
27	0.05	0000	0350	3.8	0.05
28	0				
29	0				
30	Trace				
31	0				
Total Monthly Precipitation	1.48				

(a) Monthly runon samples collected at Locations 2500 and 2501.

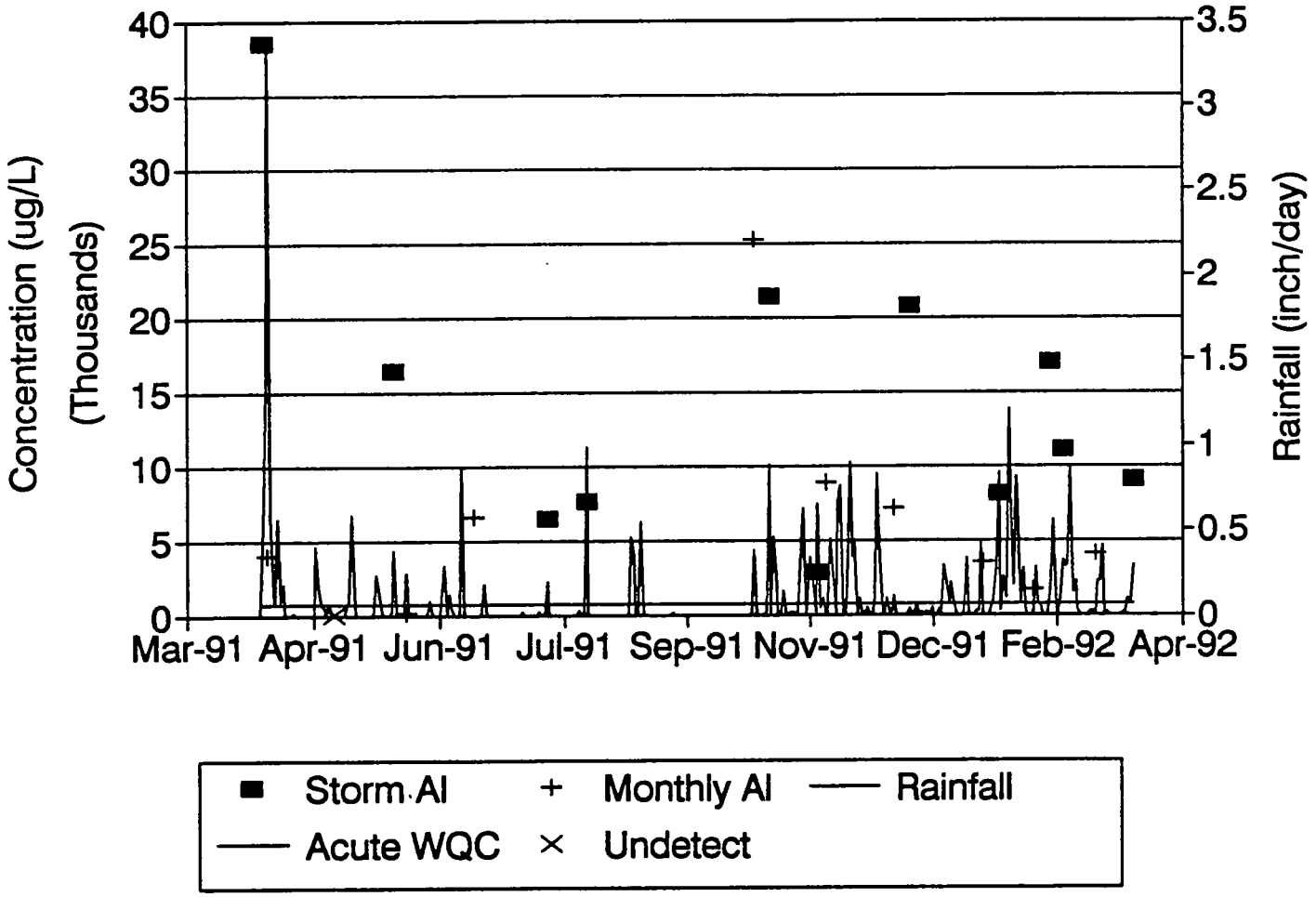
APPENDIX SW-B

ANALYTE CONCENTRATIONS FOR SURFACE WATER RUNON

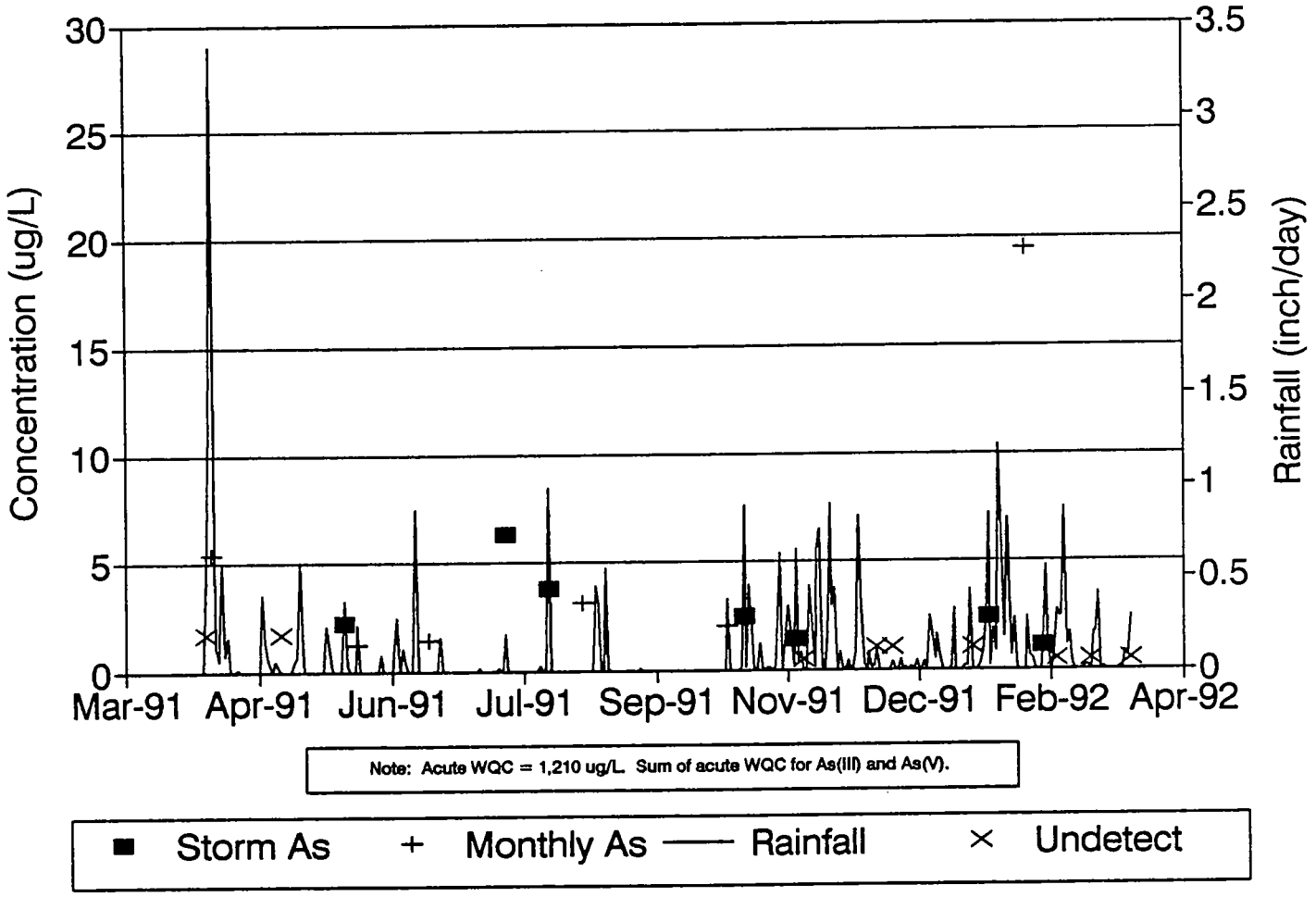
ALUMINUM (Al) CONCENTRATIONS IN SURFACE WATER RUNON AT LOCATION 2500



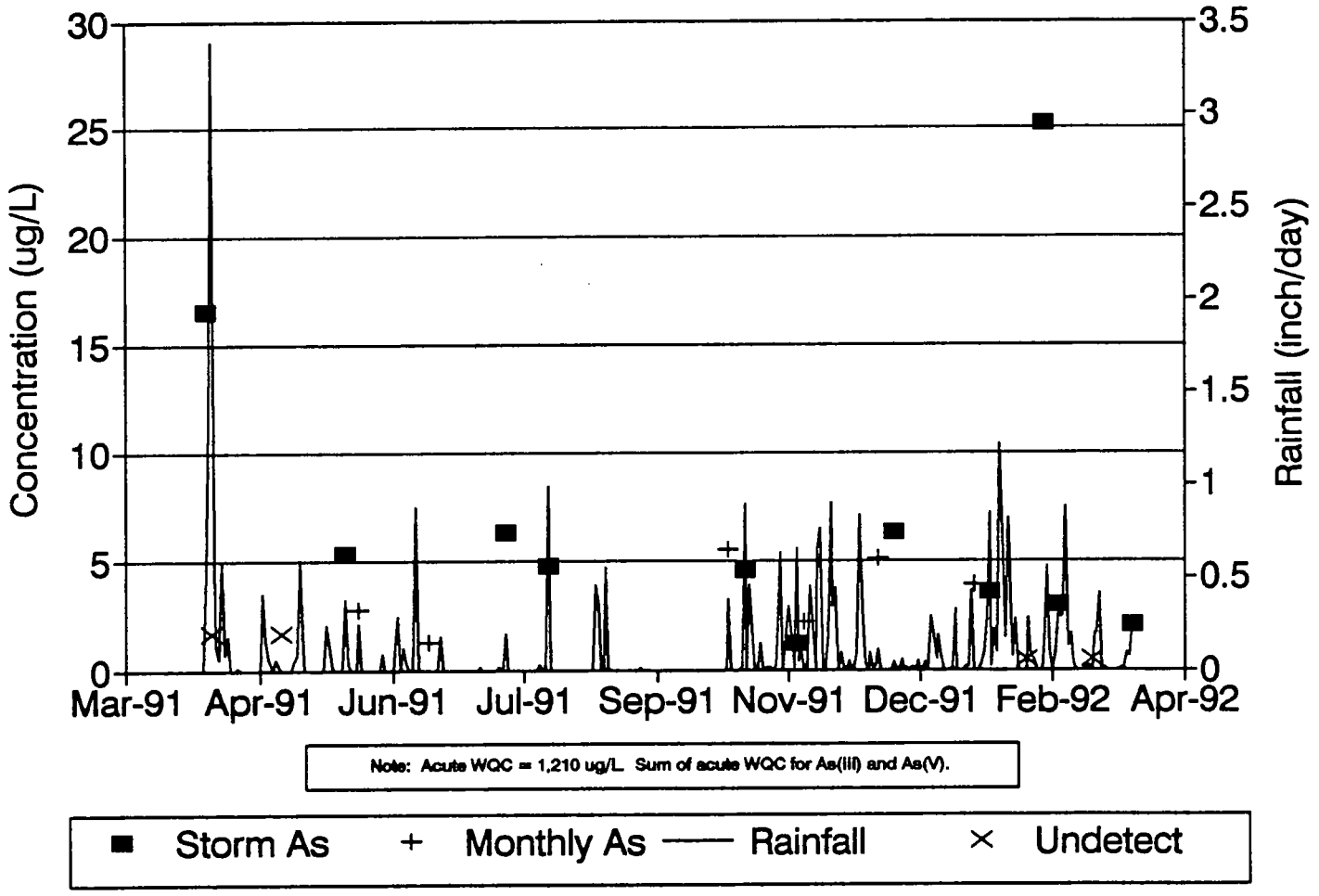
ALUMINUM (Al) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2501



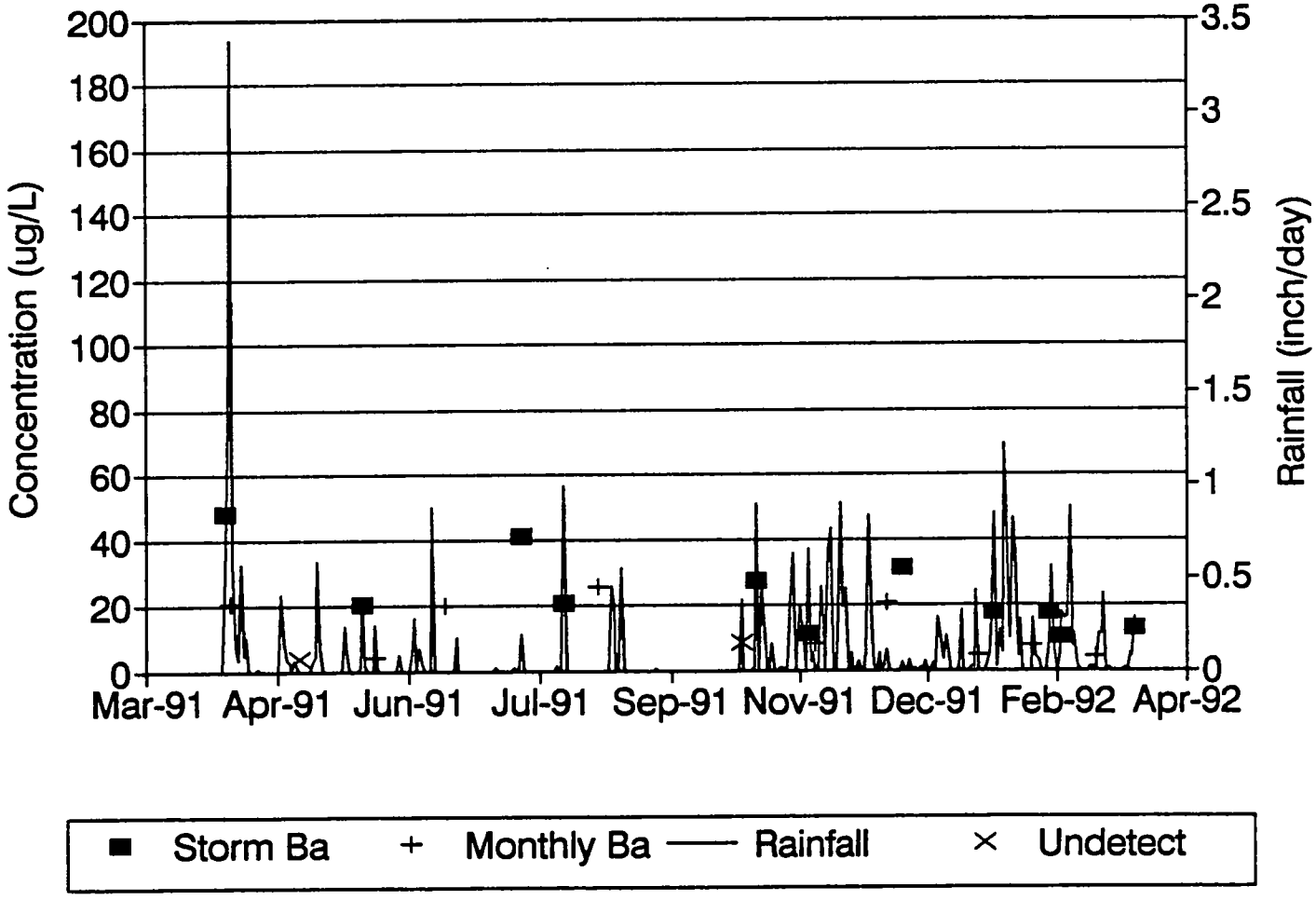
ARSENIC (As) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2500



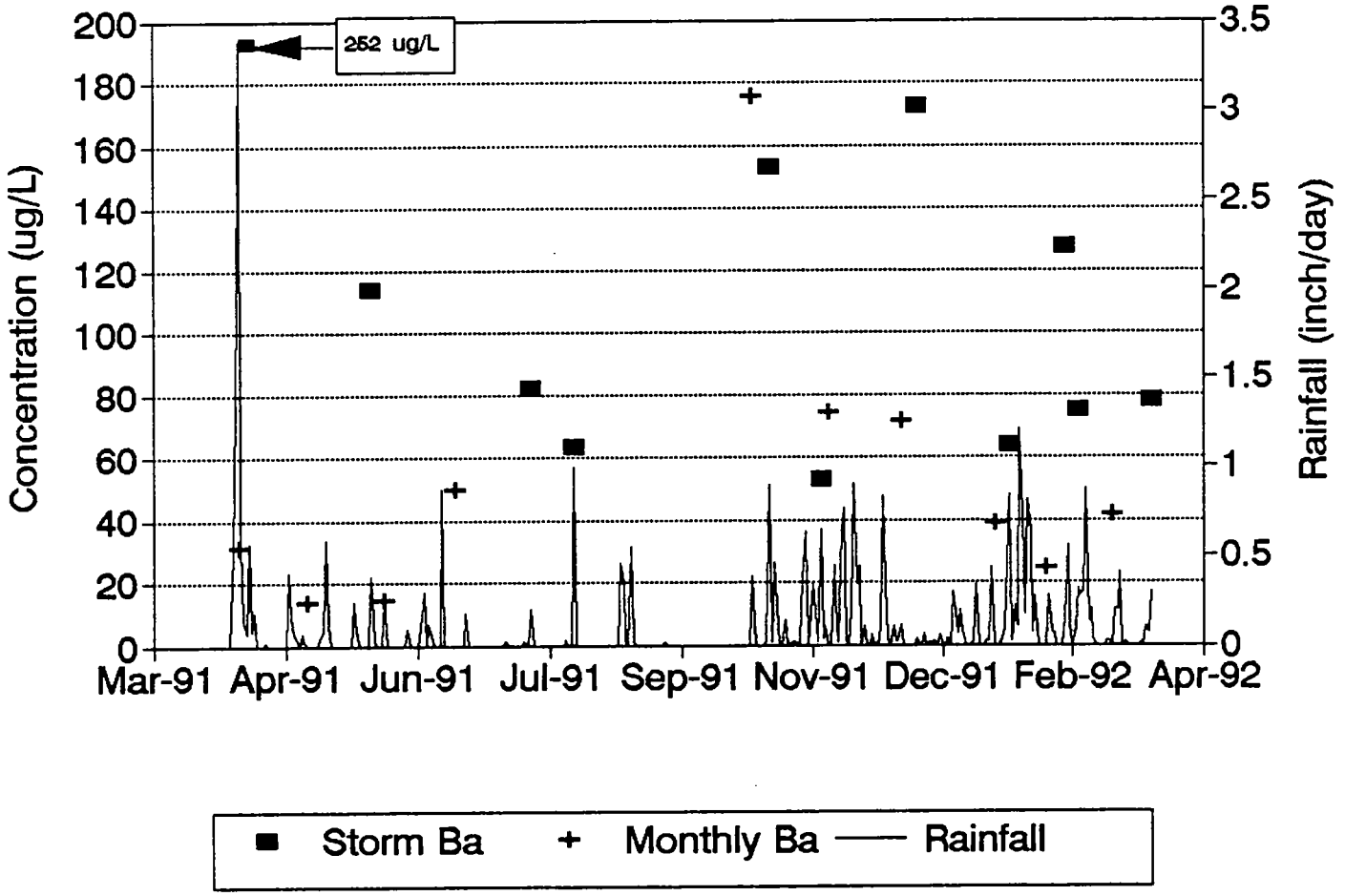
ARSENIC (As) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2501



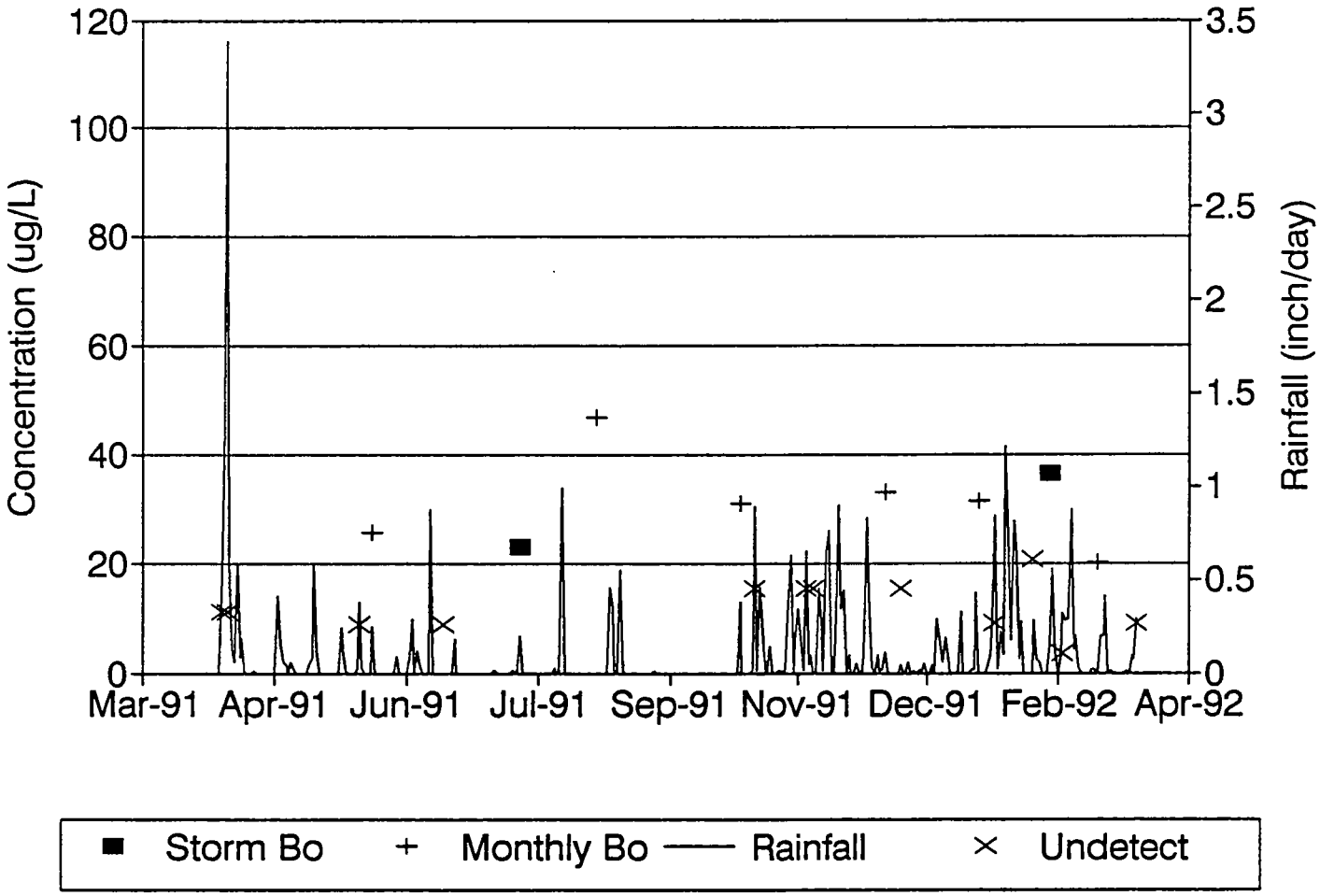
BARIUM (Ba) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2500



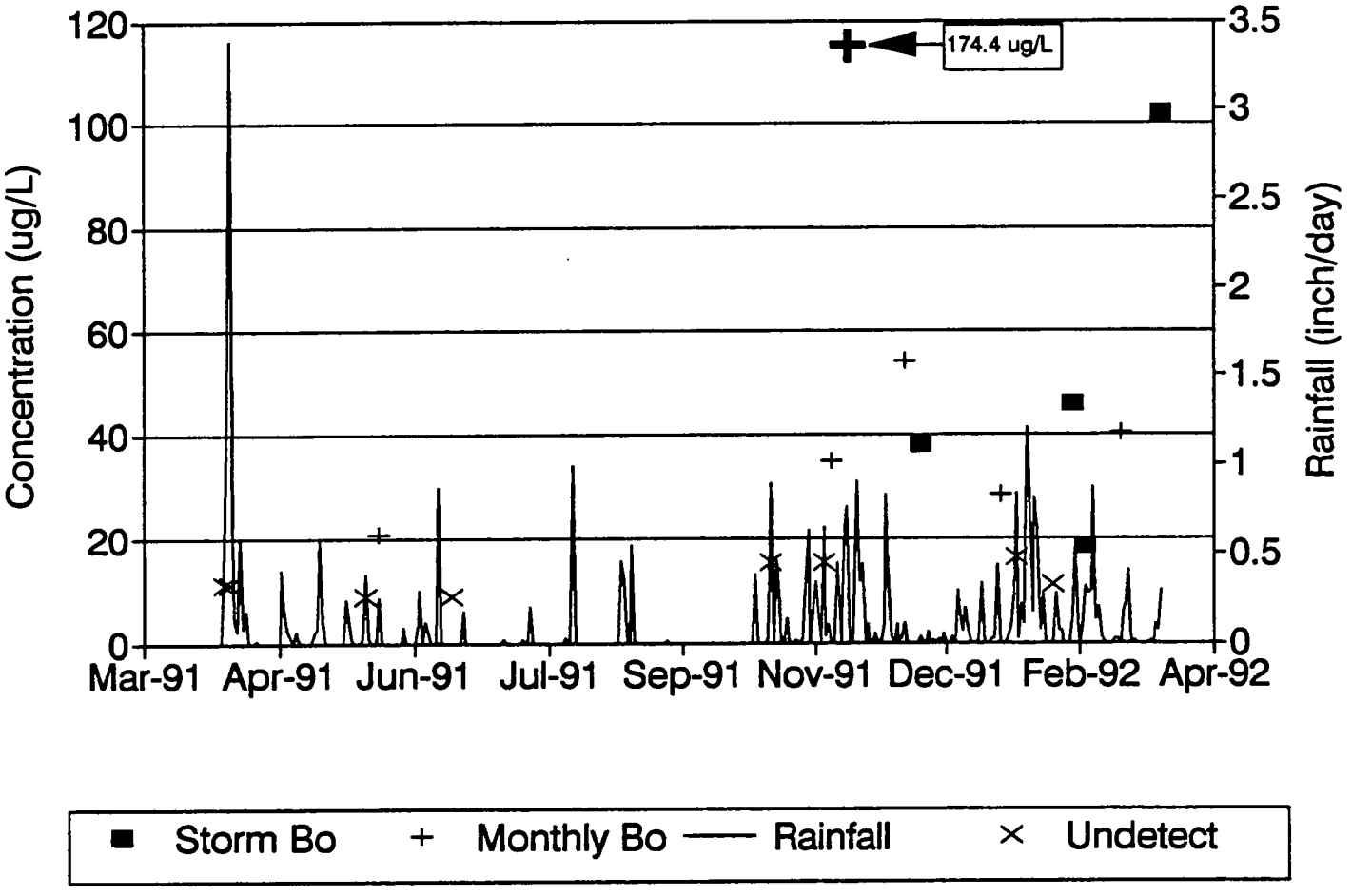
BARIUM (Ba) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2501



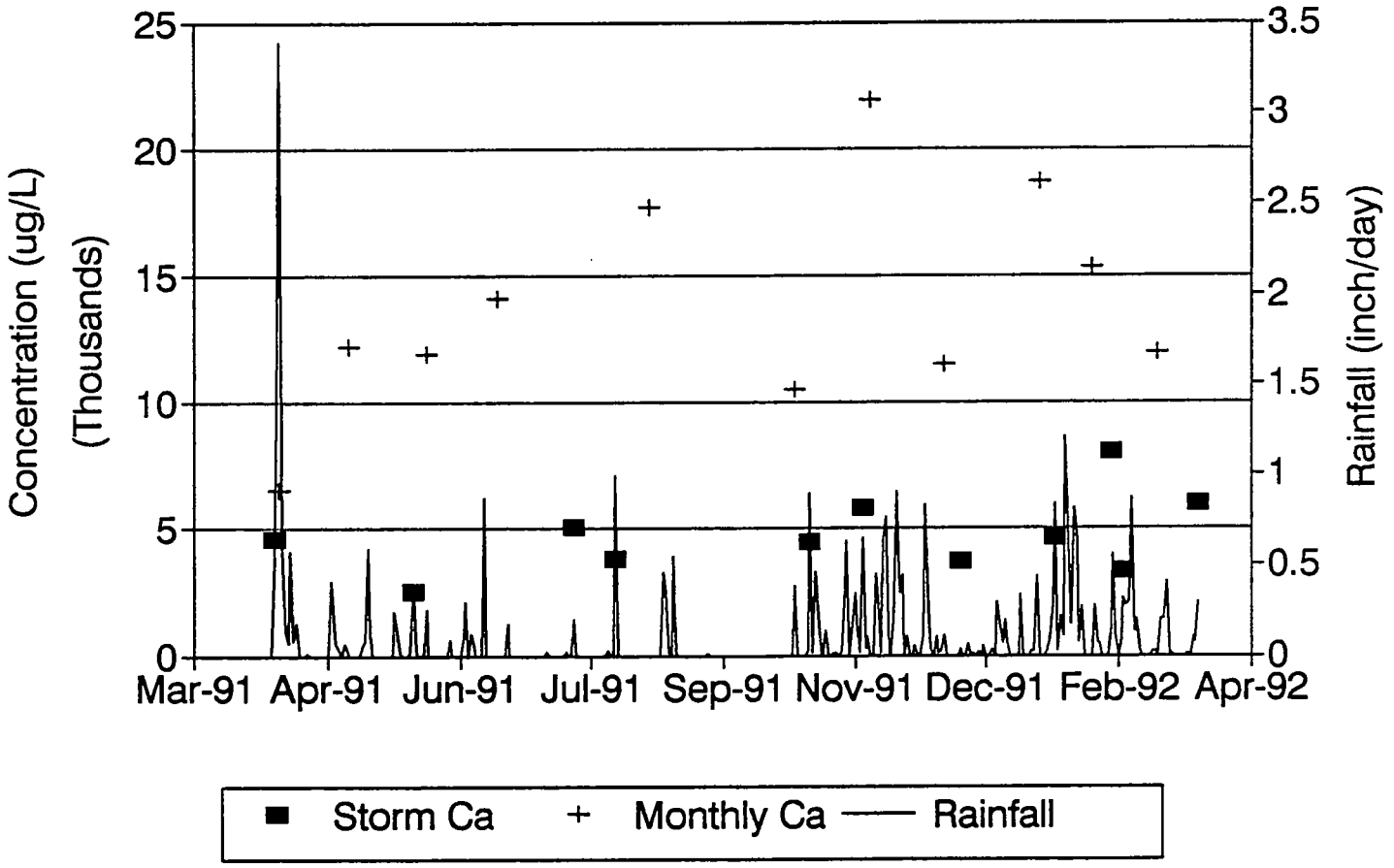
BORON (Bo) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2500



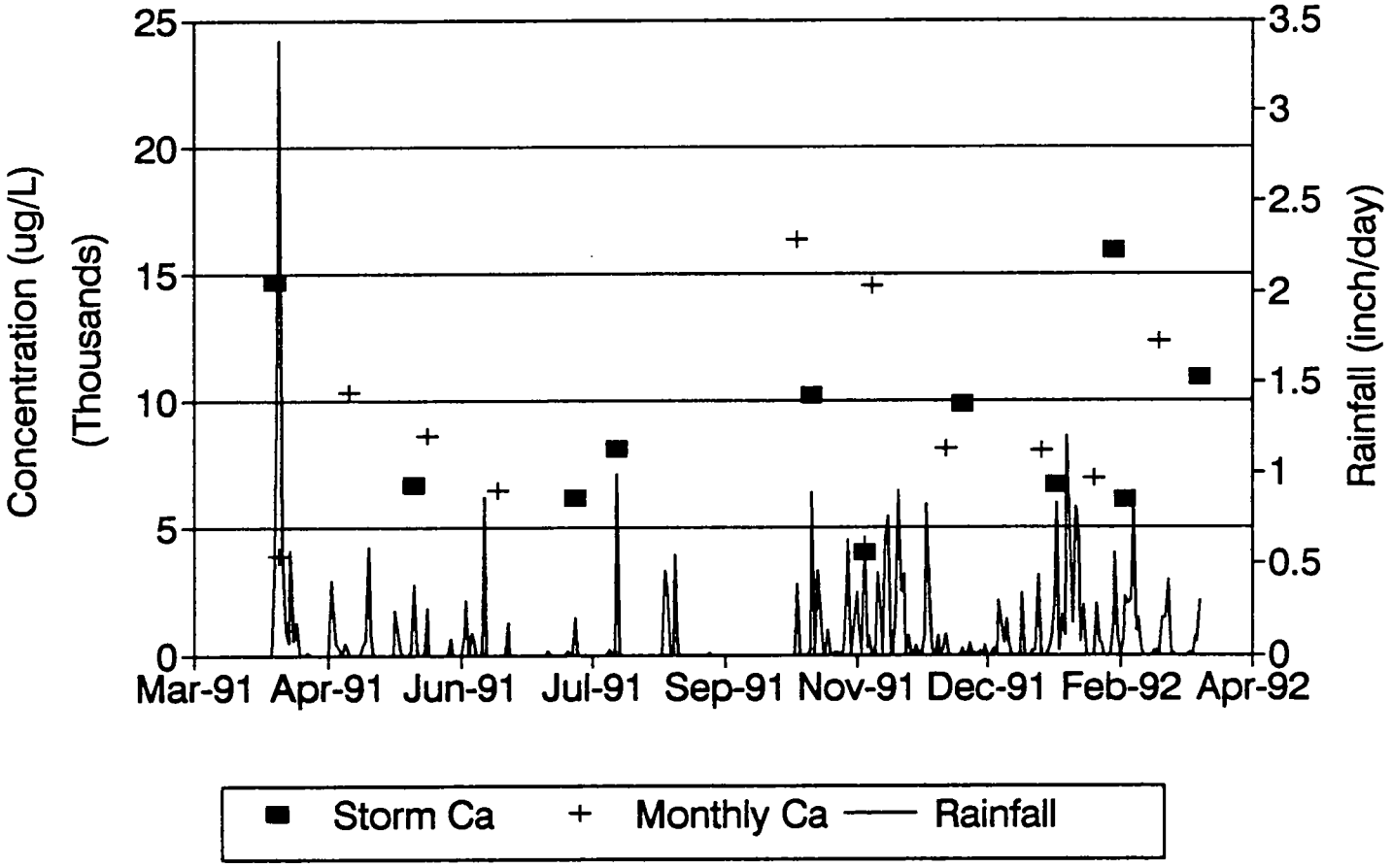
BORON (Bo) CONCENTRATIONS IN SURFACE WATER RUNON AT LOCATION 2501



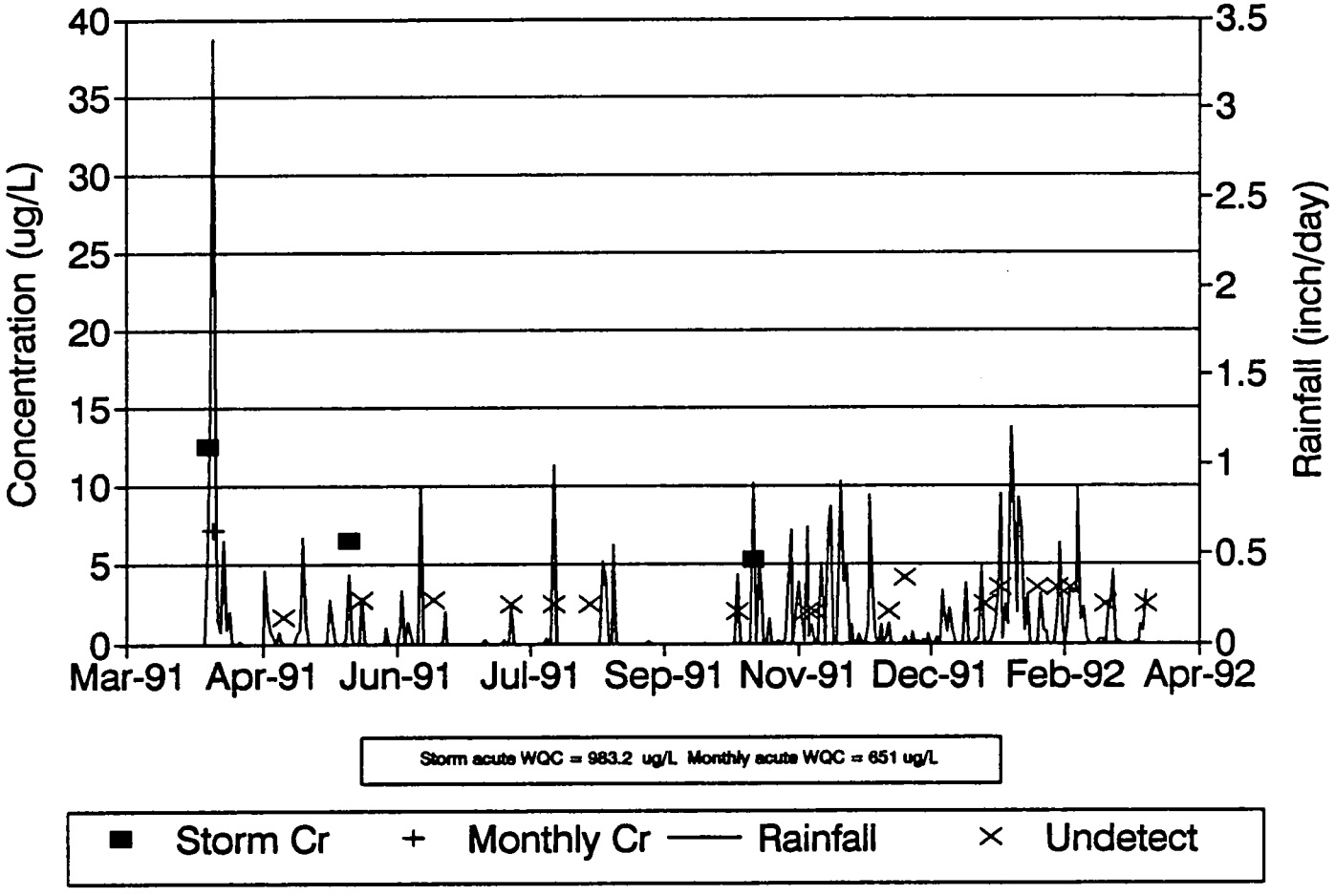
CALCIUM (Ca) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2500



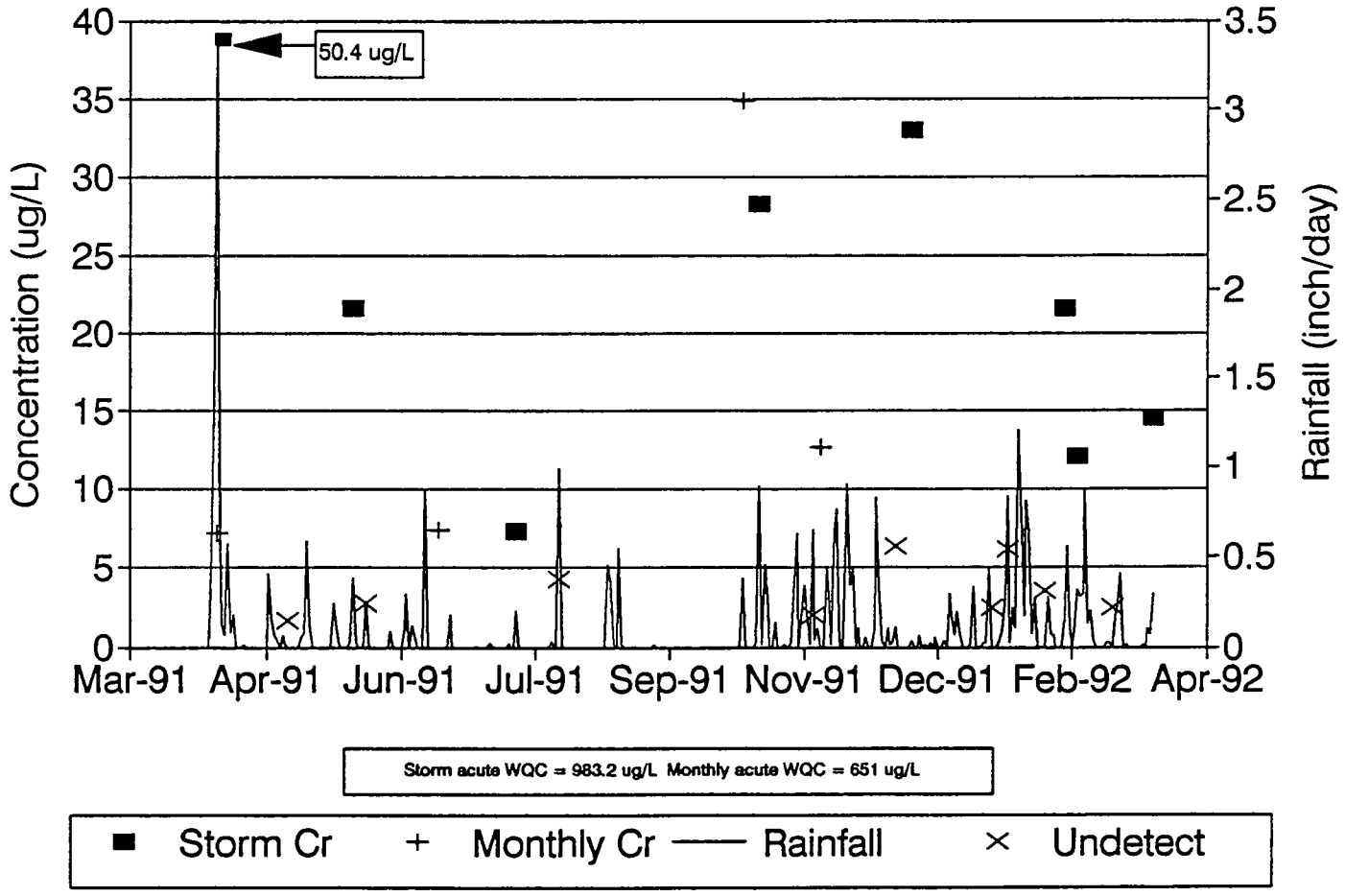
CALCIUM (Ca) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2501



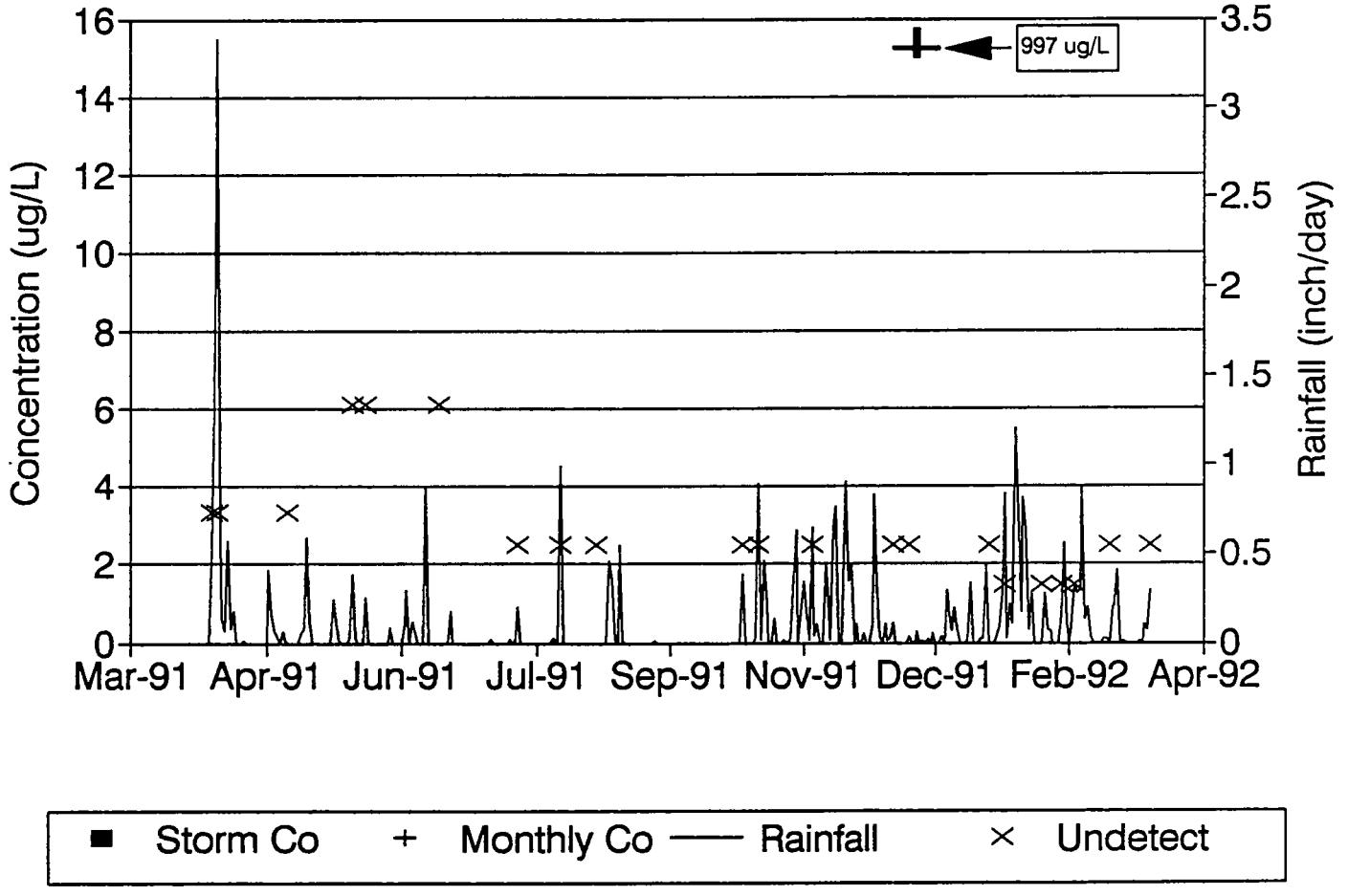
CHROMIUM (Cr) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2500



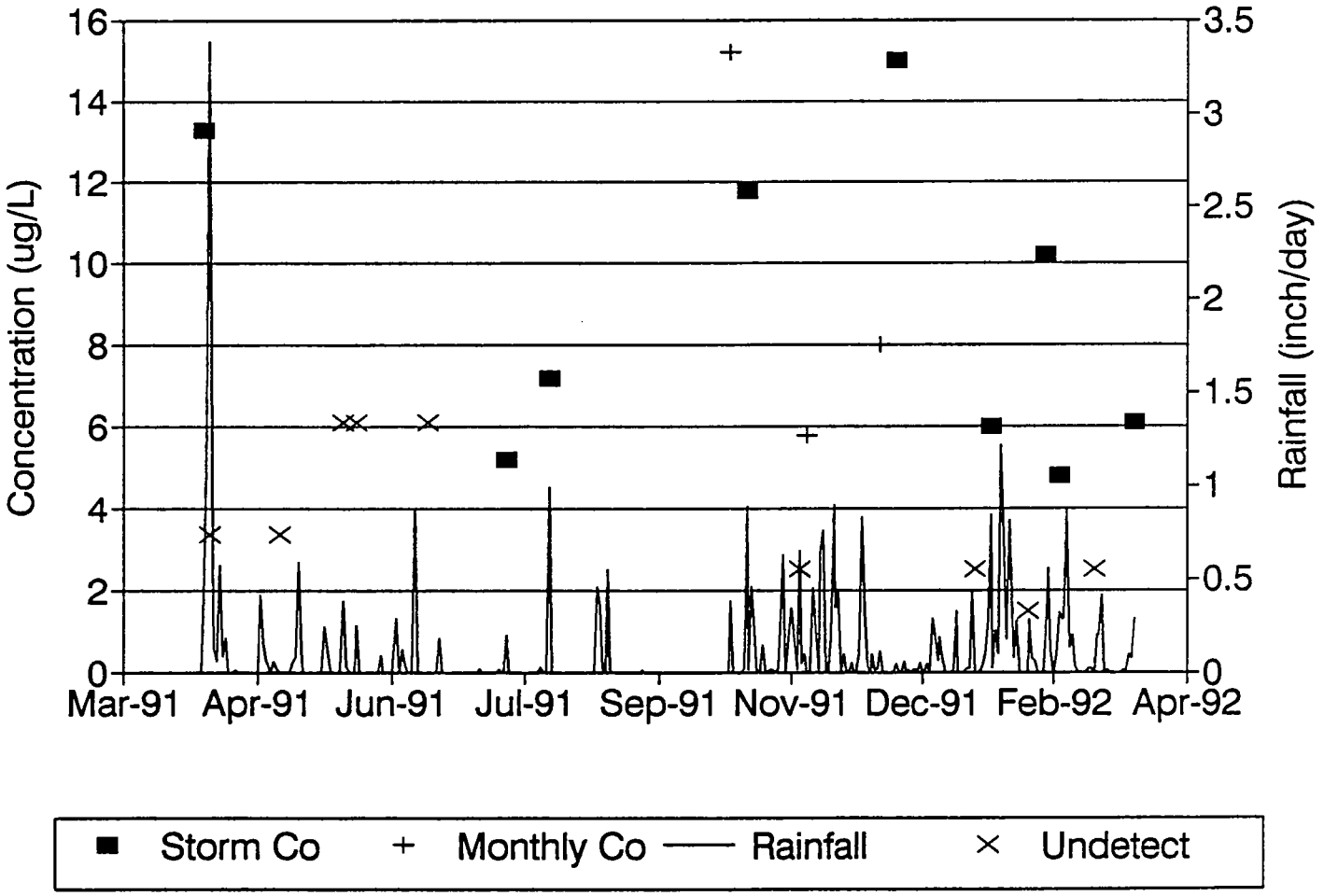
CHROMIUM (Cr) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2501



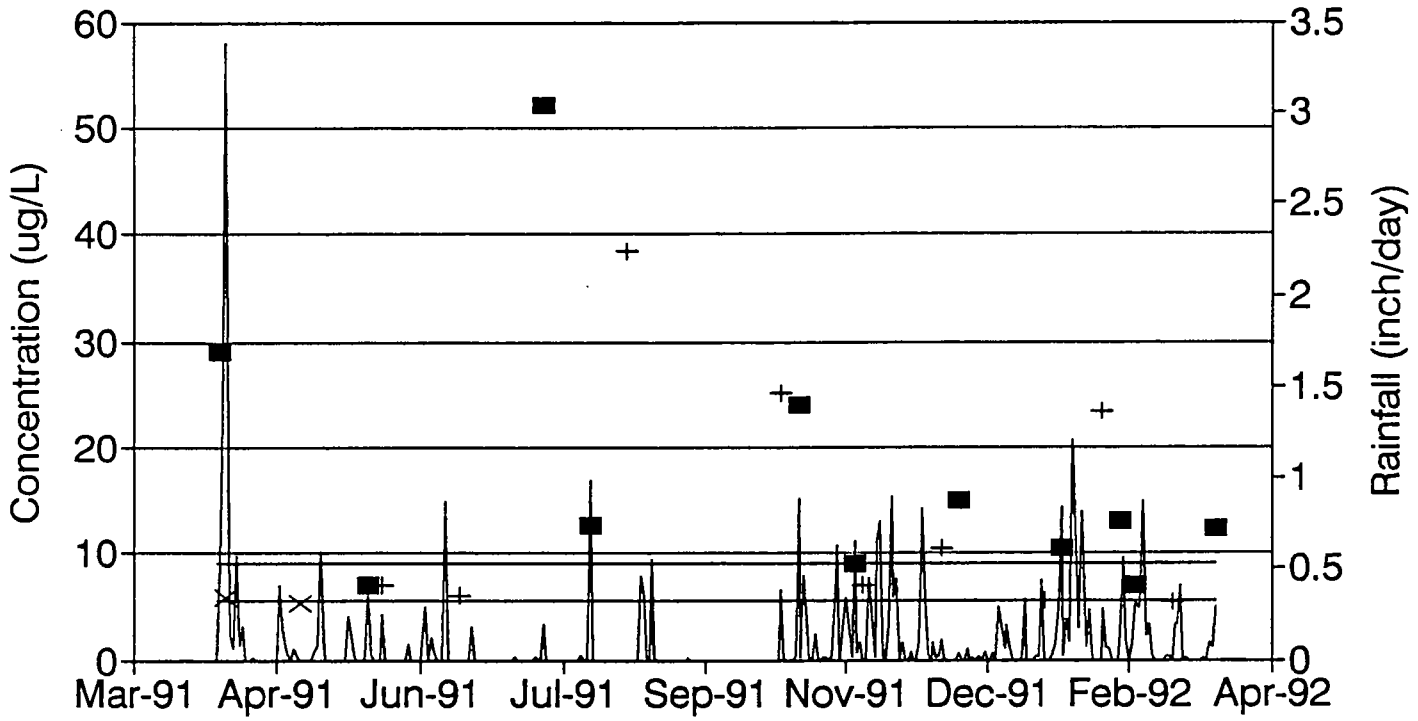
COBALT (Co) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2500



COBALT (Co) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2501

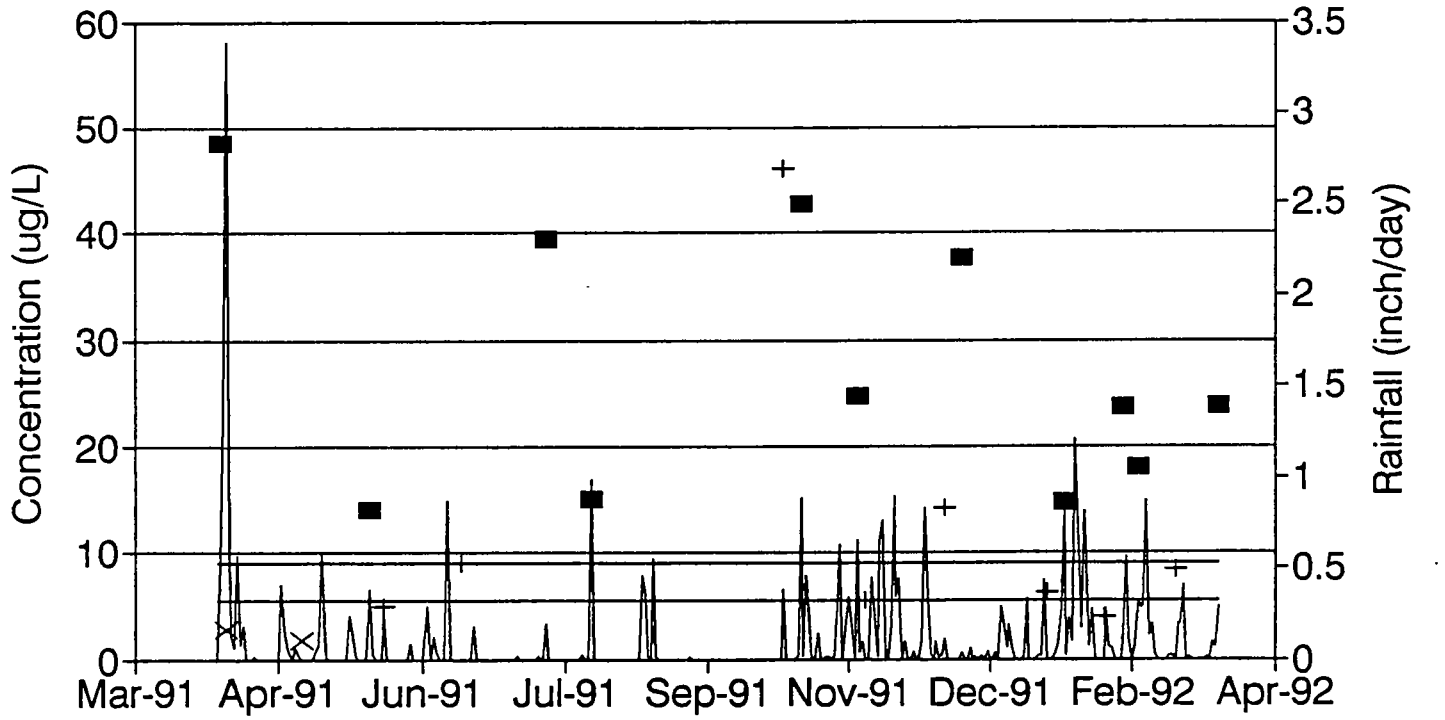


COPPER (Cu) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2500



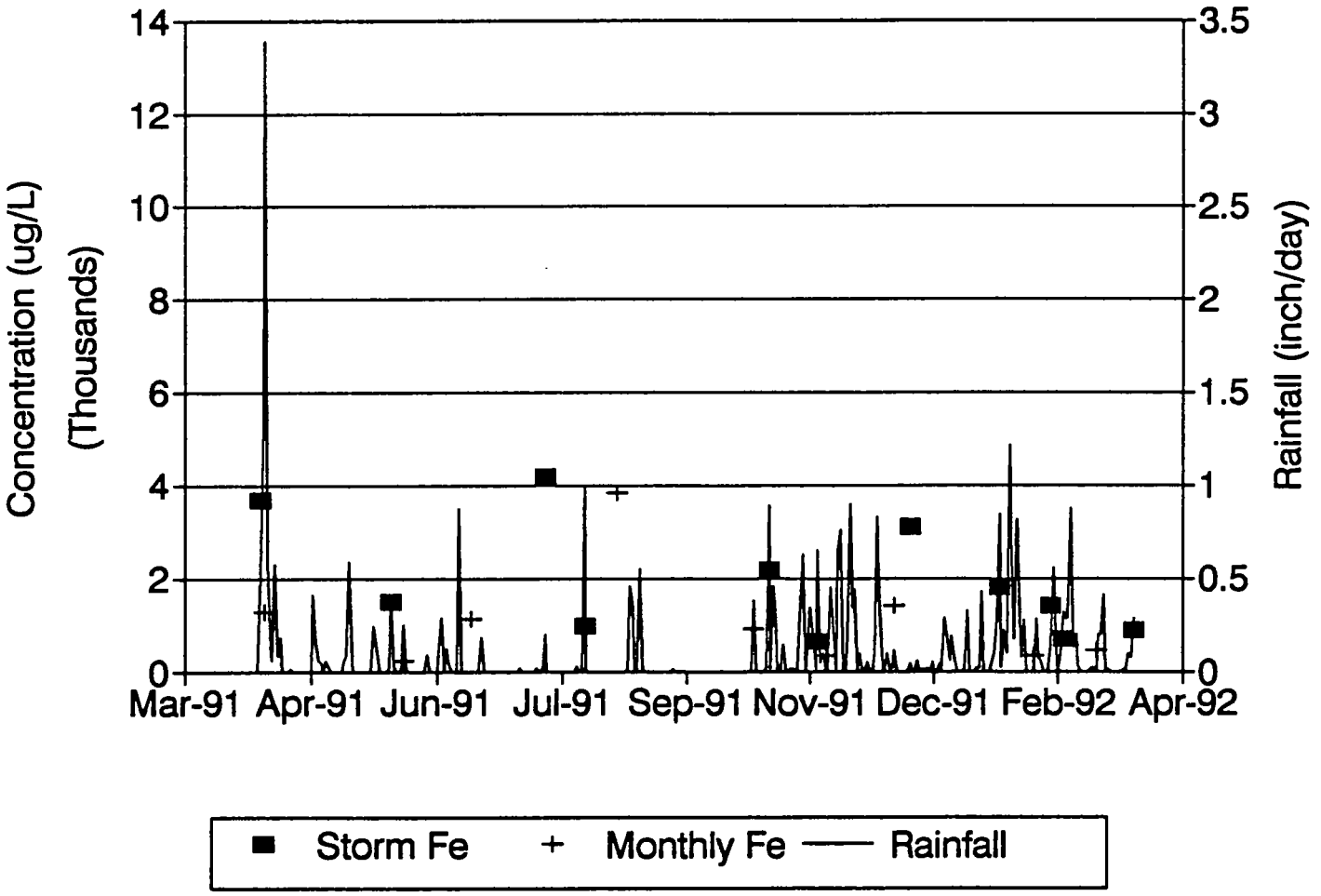
Storm Cu
Monthly Cu
Rainfall
Storm Acute WQC
Monthly Acute WQC
Undetect

COPPER (Cu) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2501

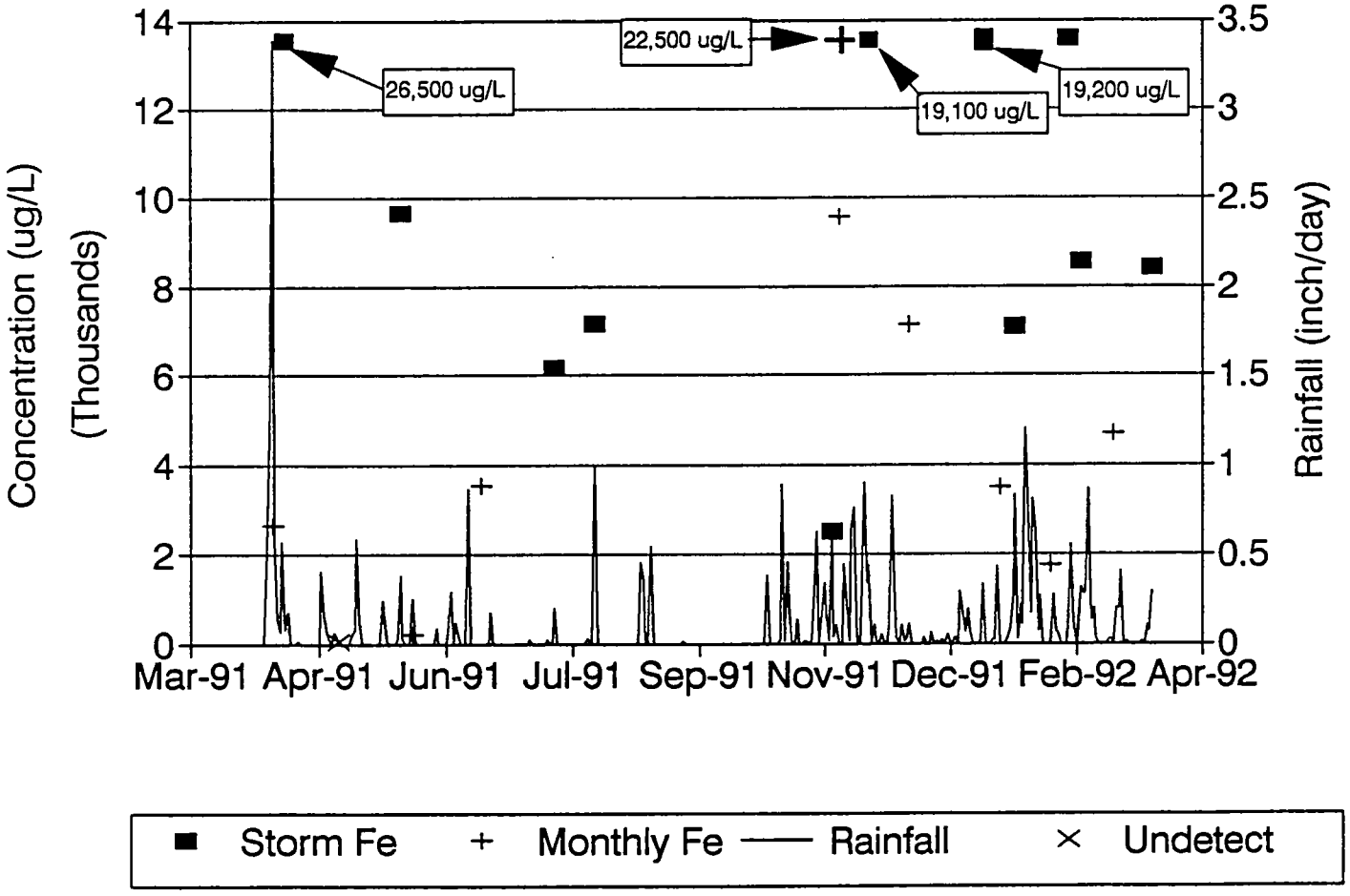


Storm Cu
Monthly Cu
Rainfall
Storm Acute WQC
Monthly Acute WQC
Undetect

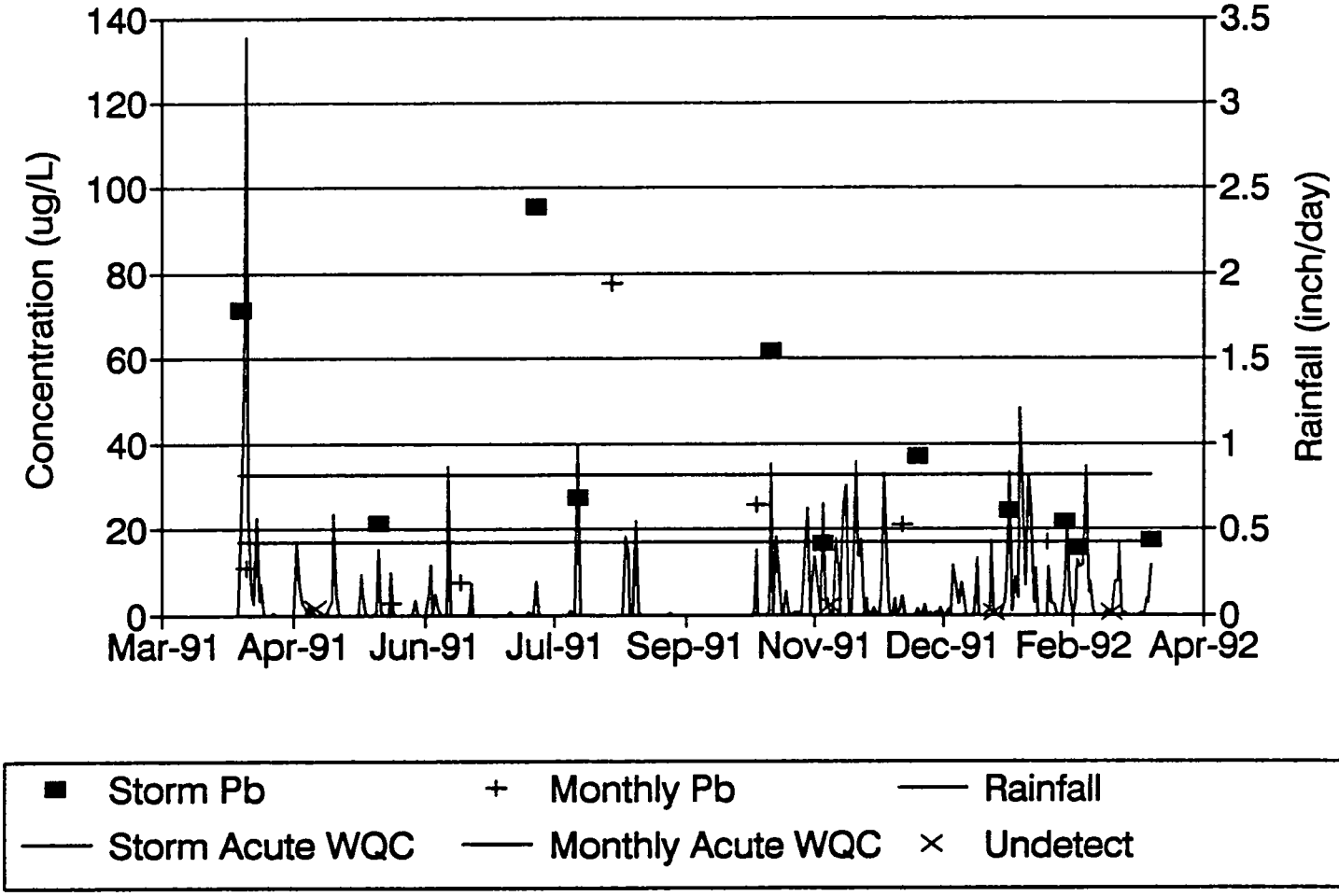
IRON (Fe) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2500



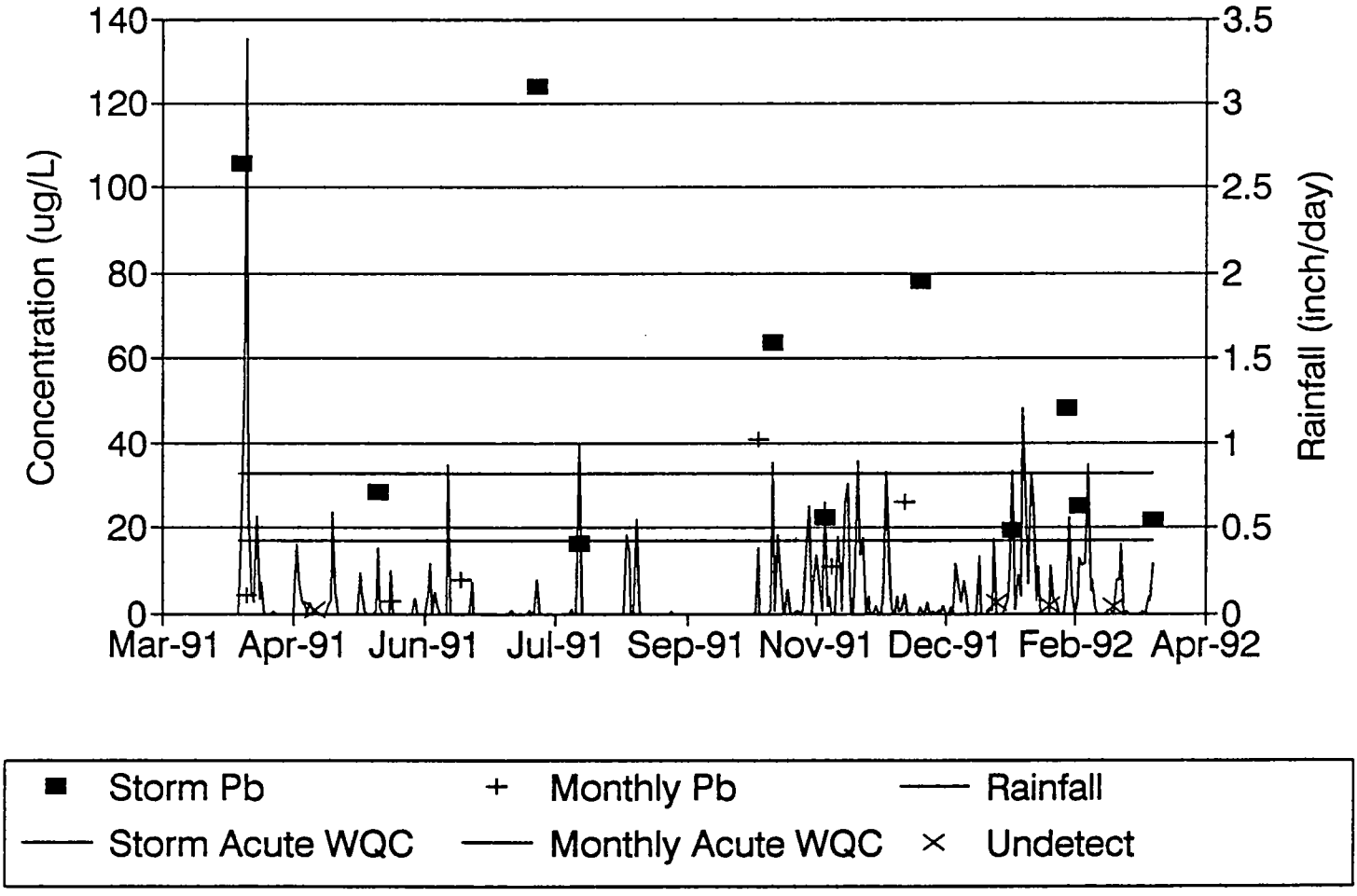
IRON (Fe) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2501



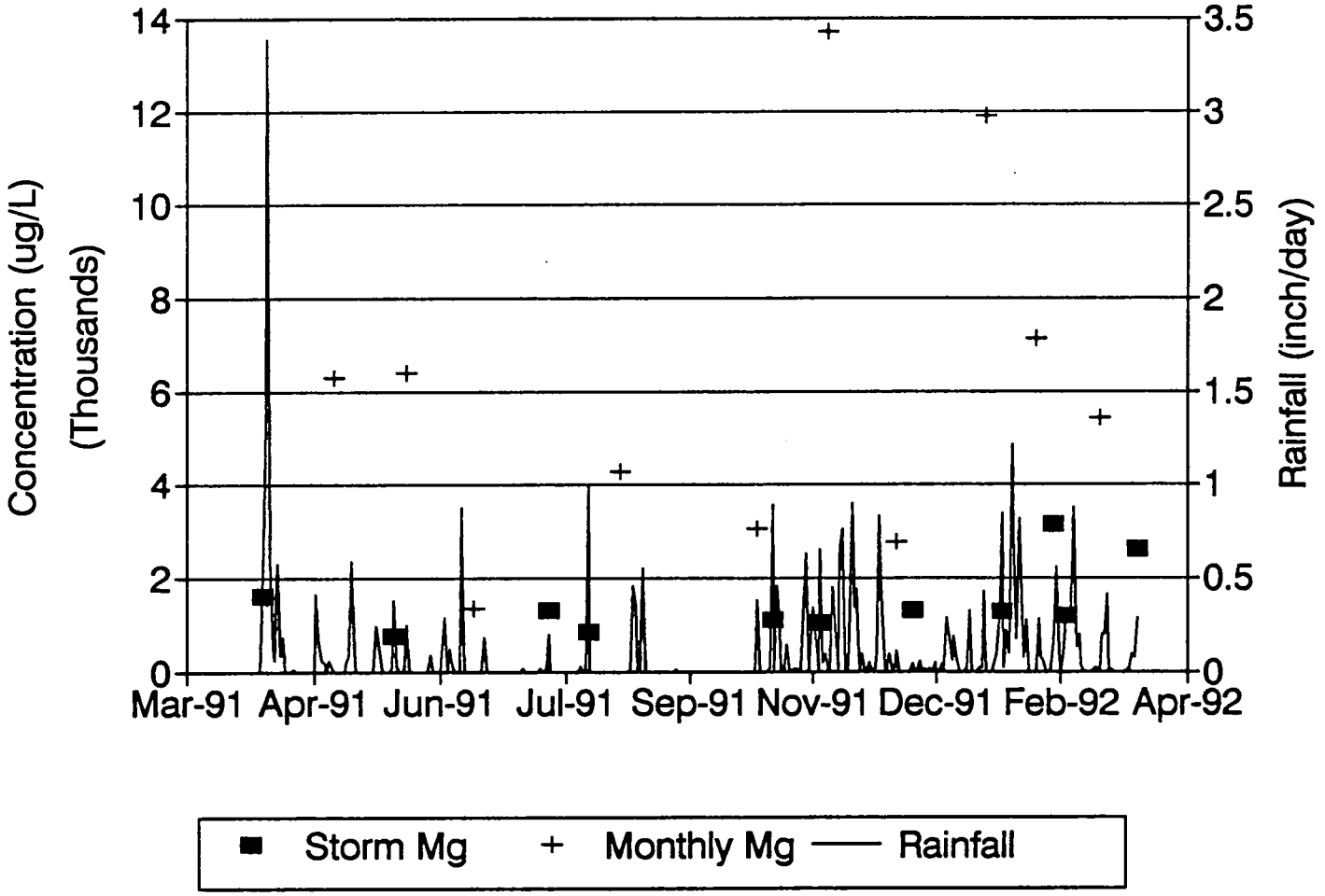
LEAD (Pb) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2500



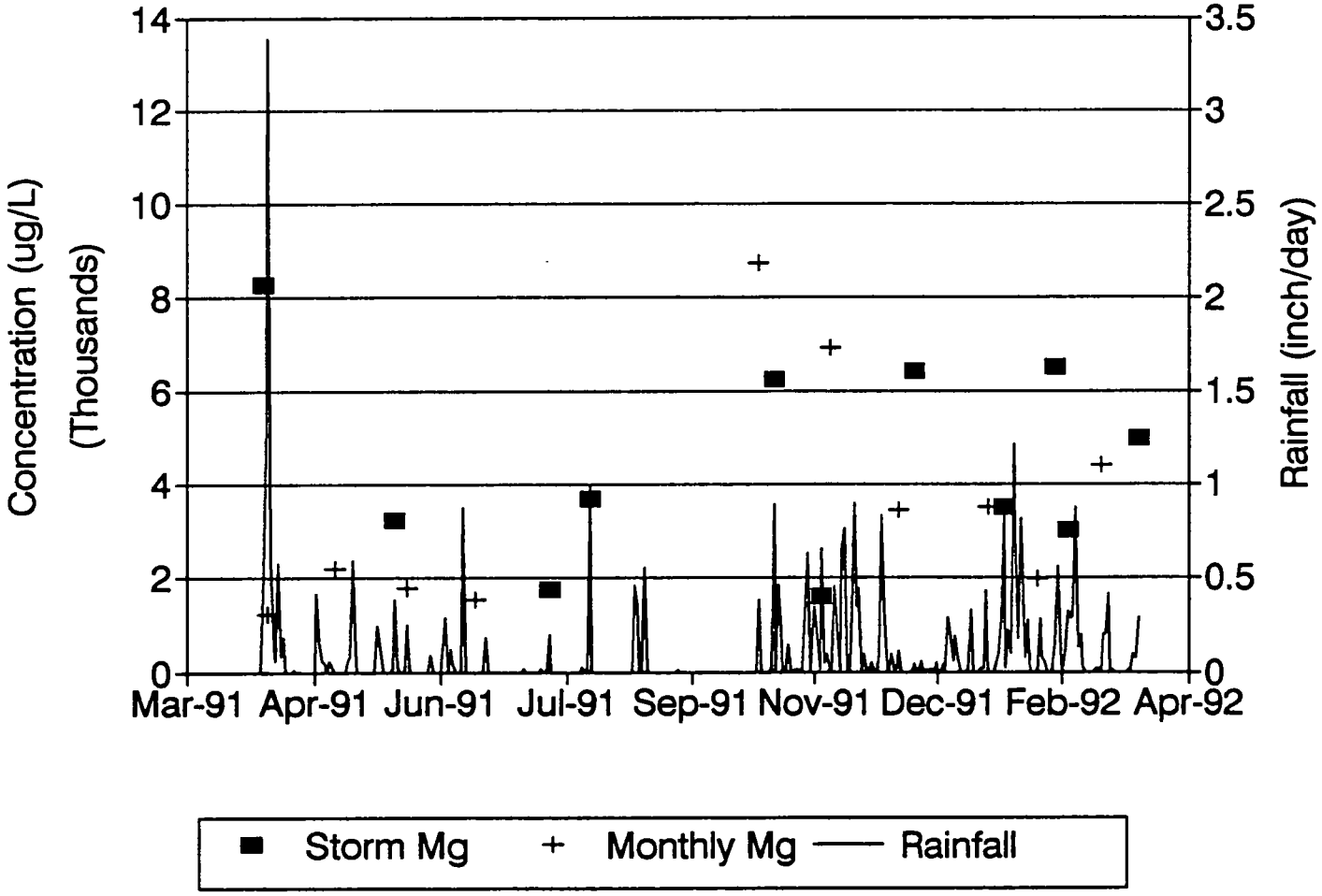
LEAD (Pb) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2501



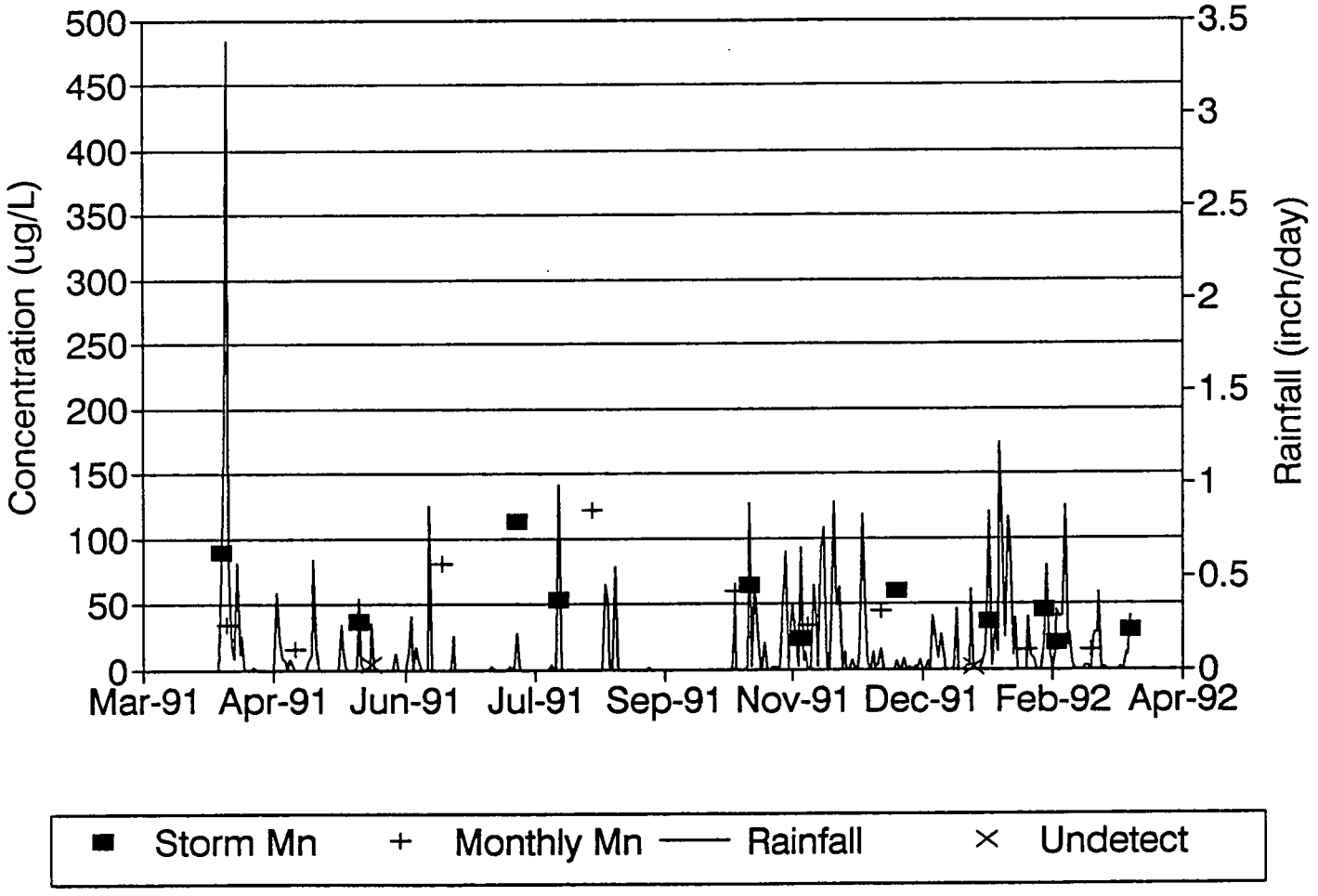
MAGNESIUM (Mg) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2500



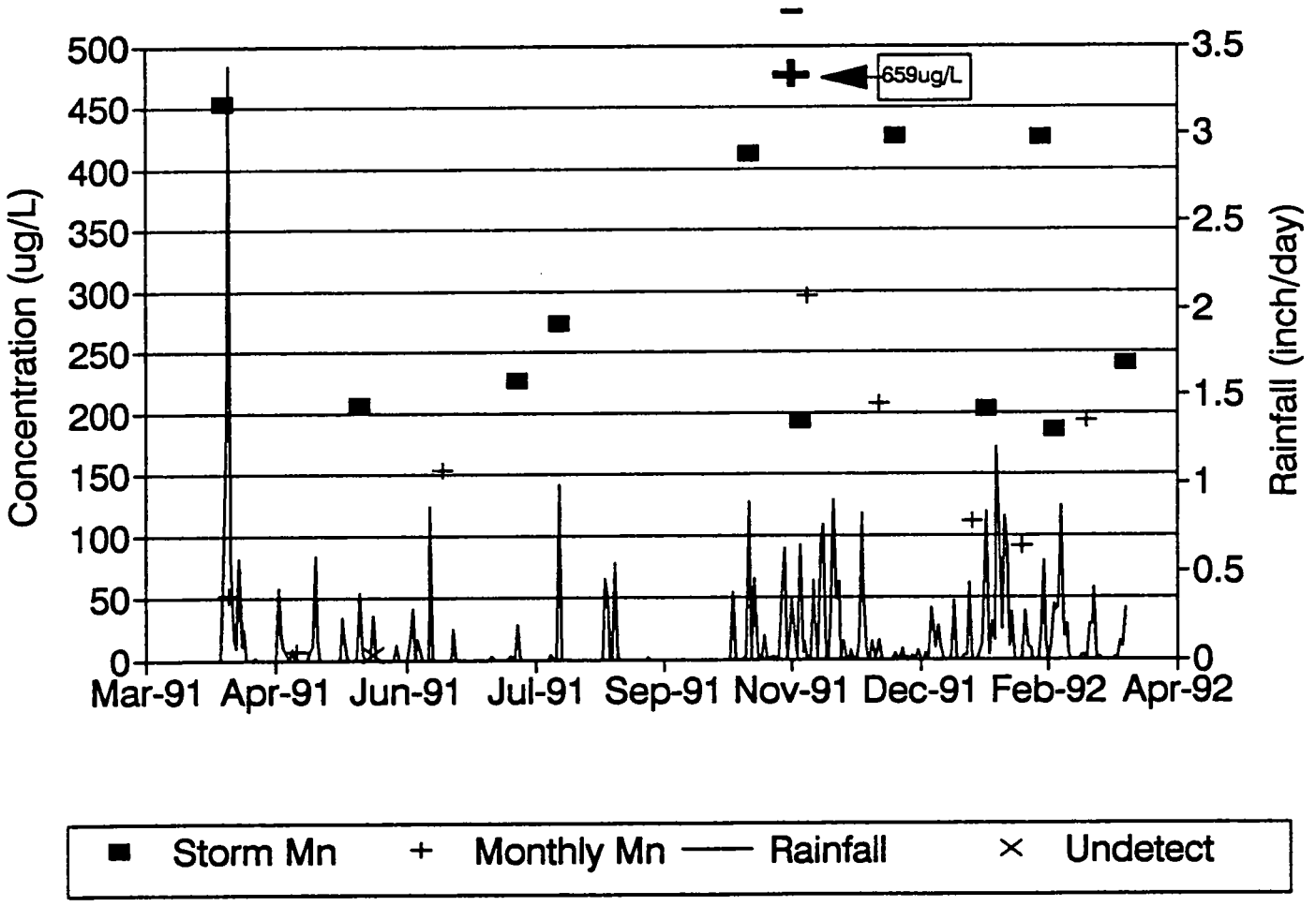
MAGNESIUM (Mg) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2501



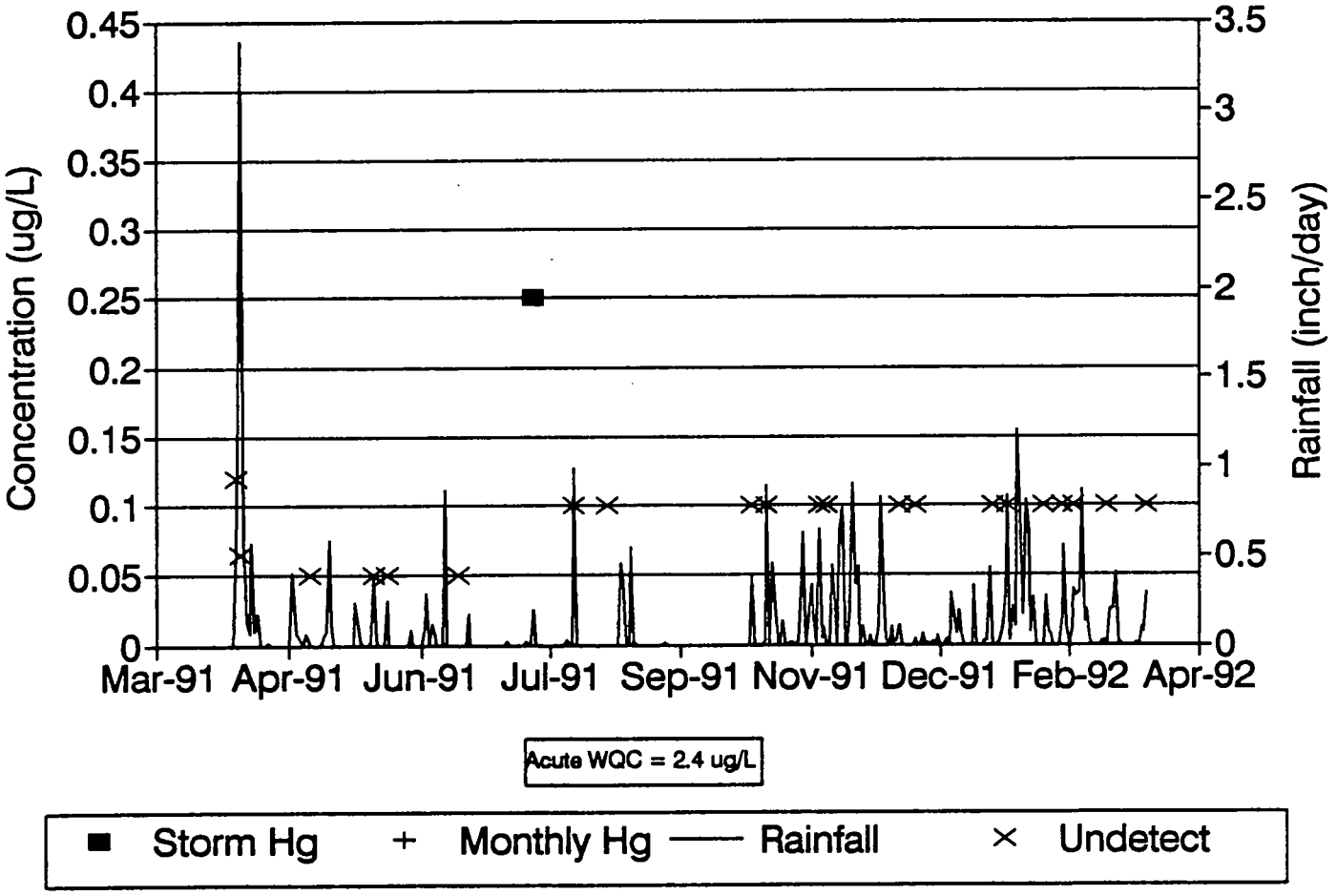
MANGANESE (Mn) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2500



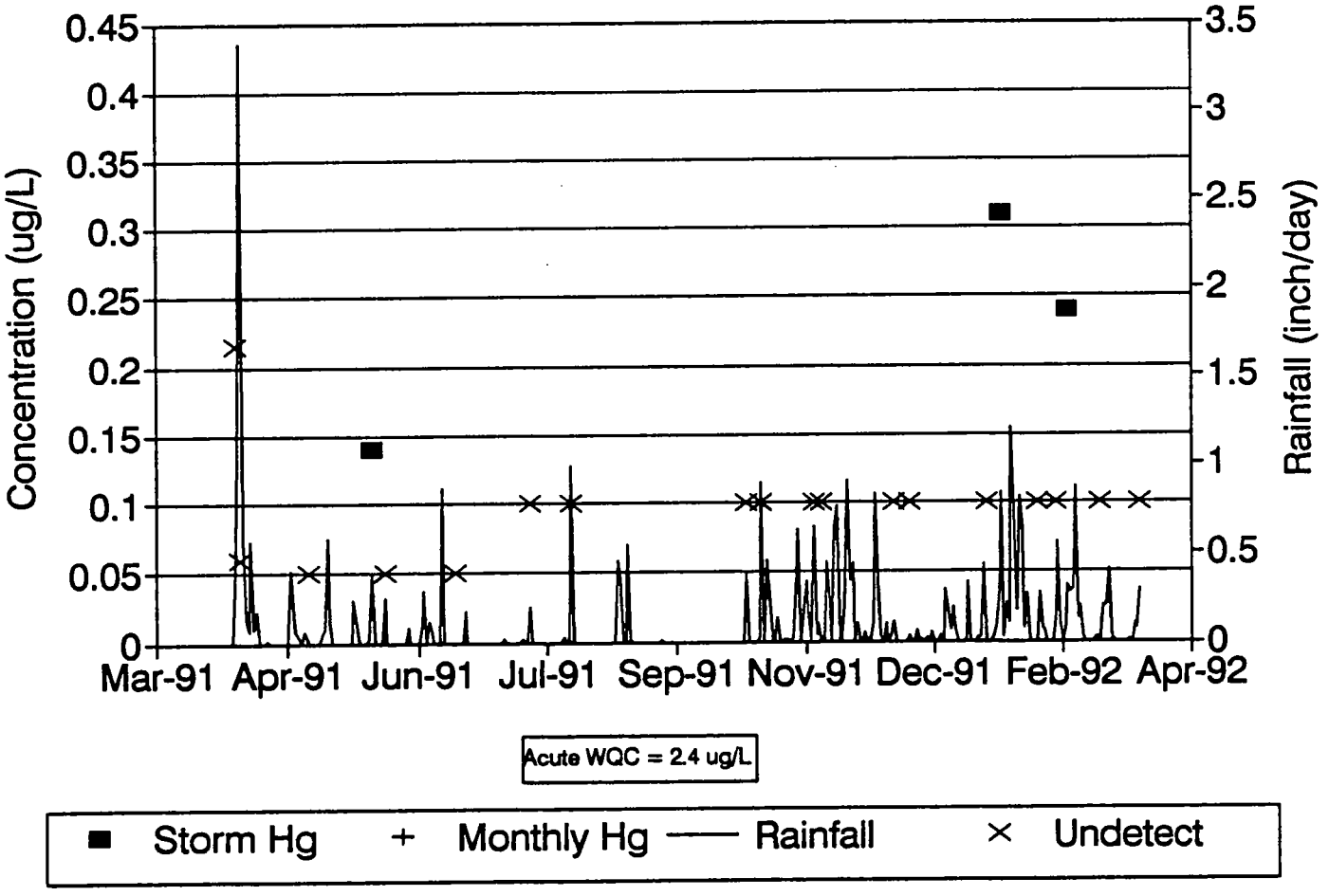
MANGANESE (Mn) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2501



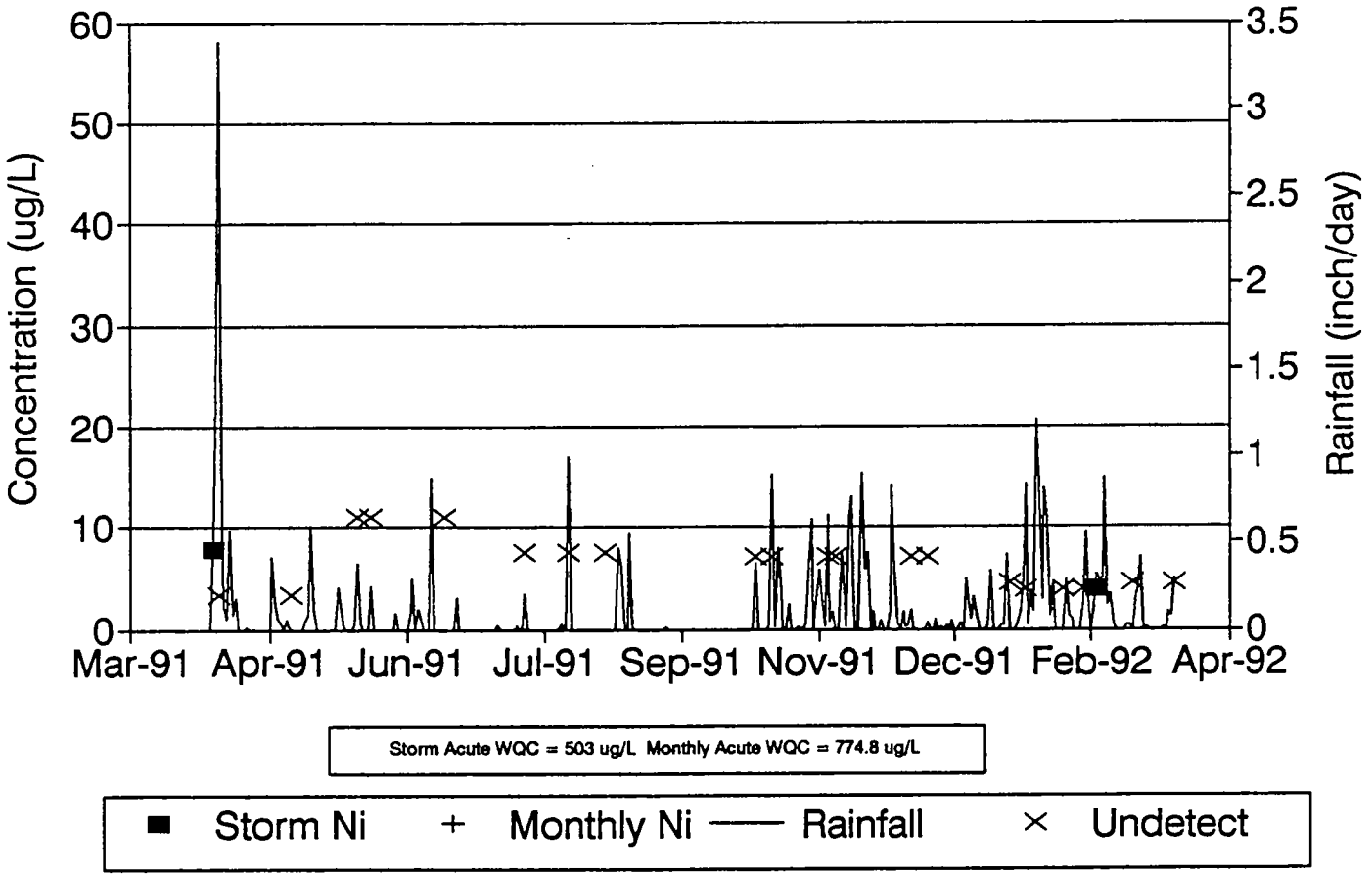
MERCURY (Hg) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2500



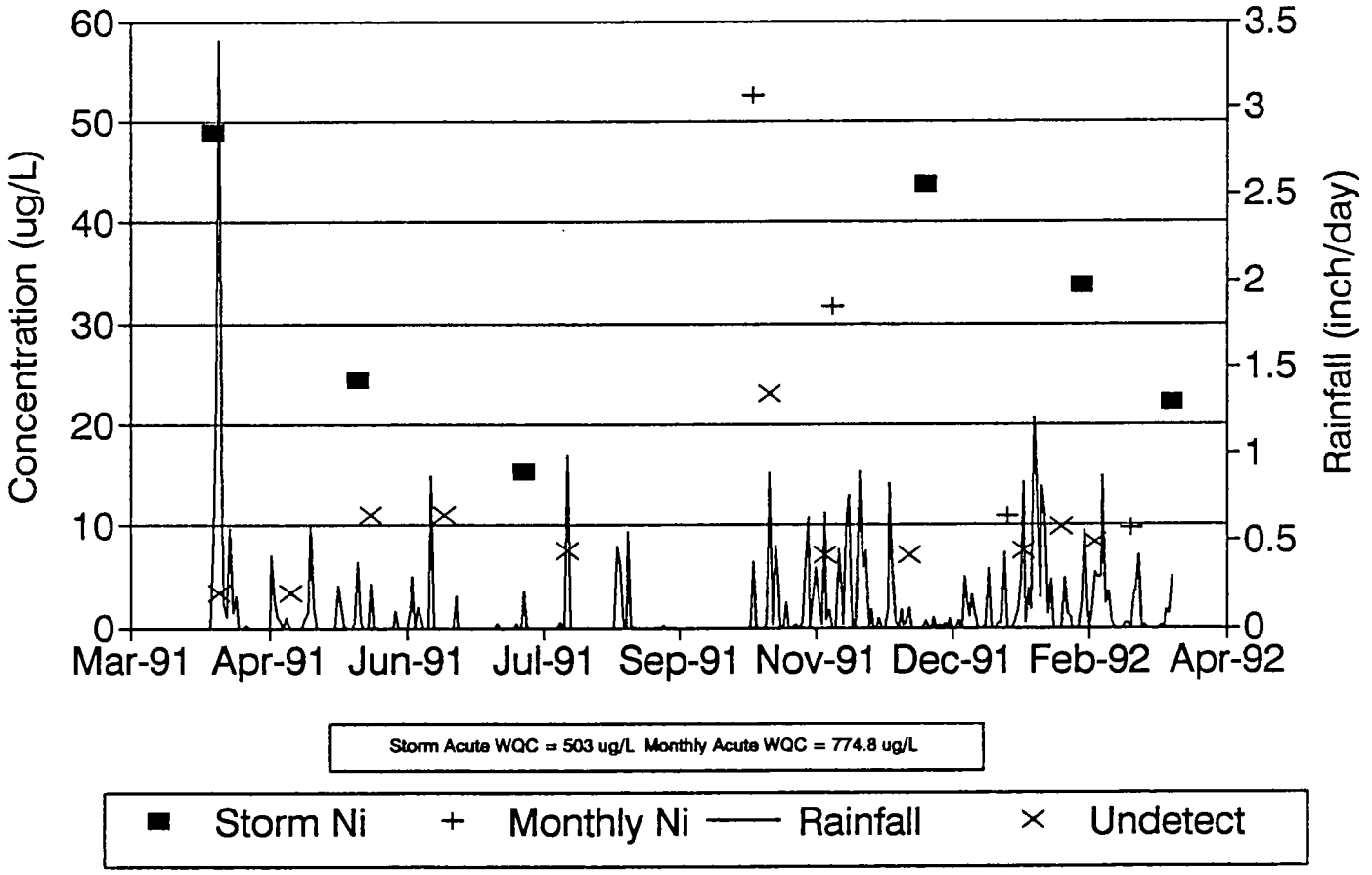
MERCURY (Hg) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2501



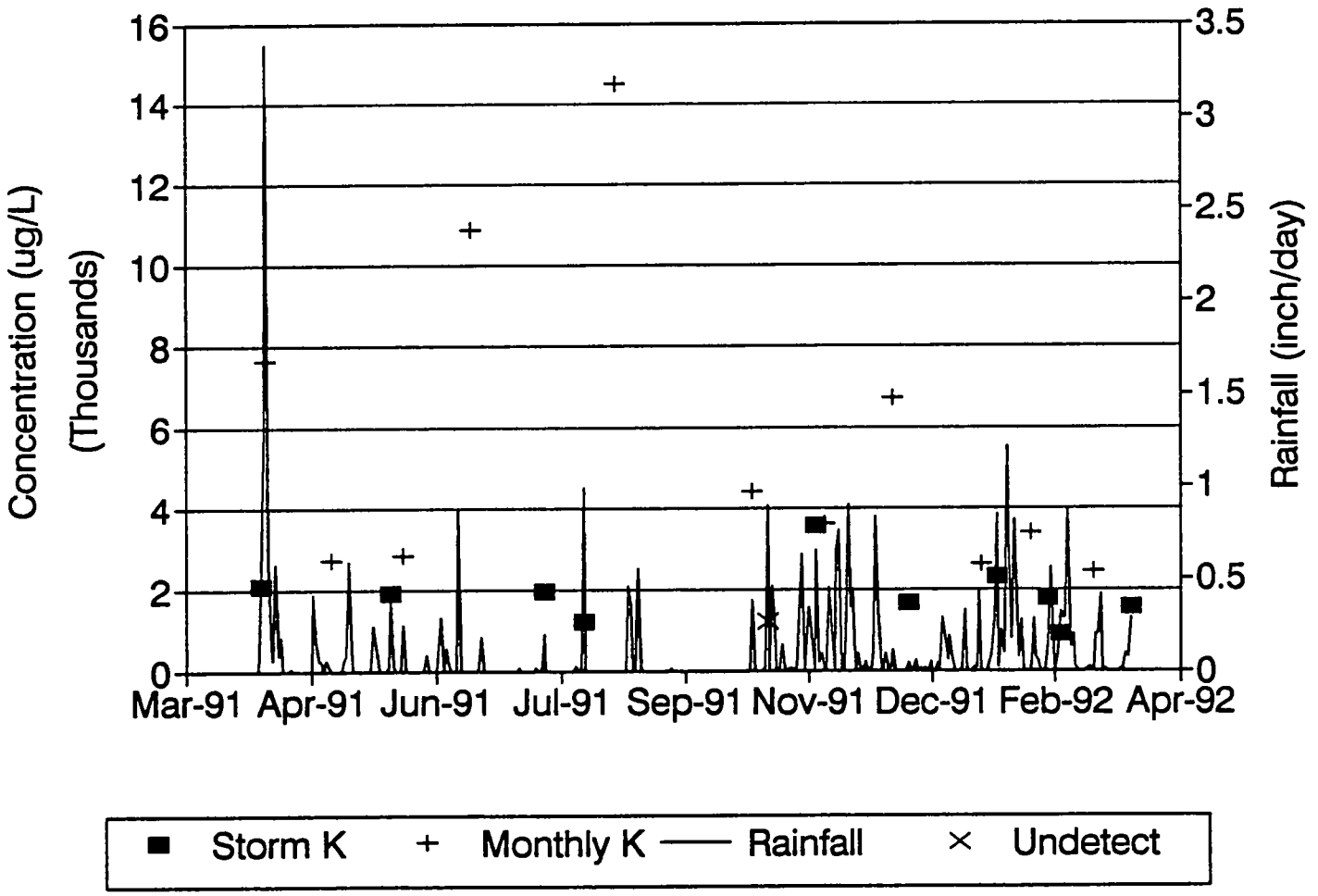
NICKEL (Ni) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2500



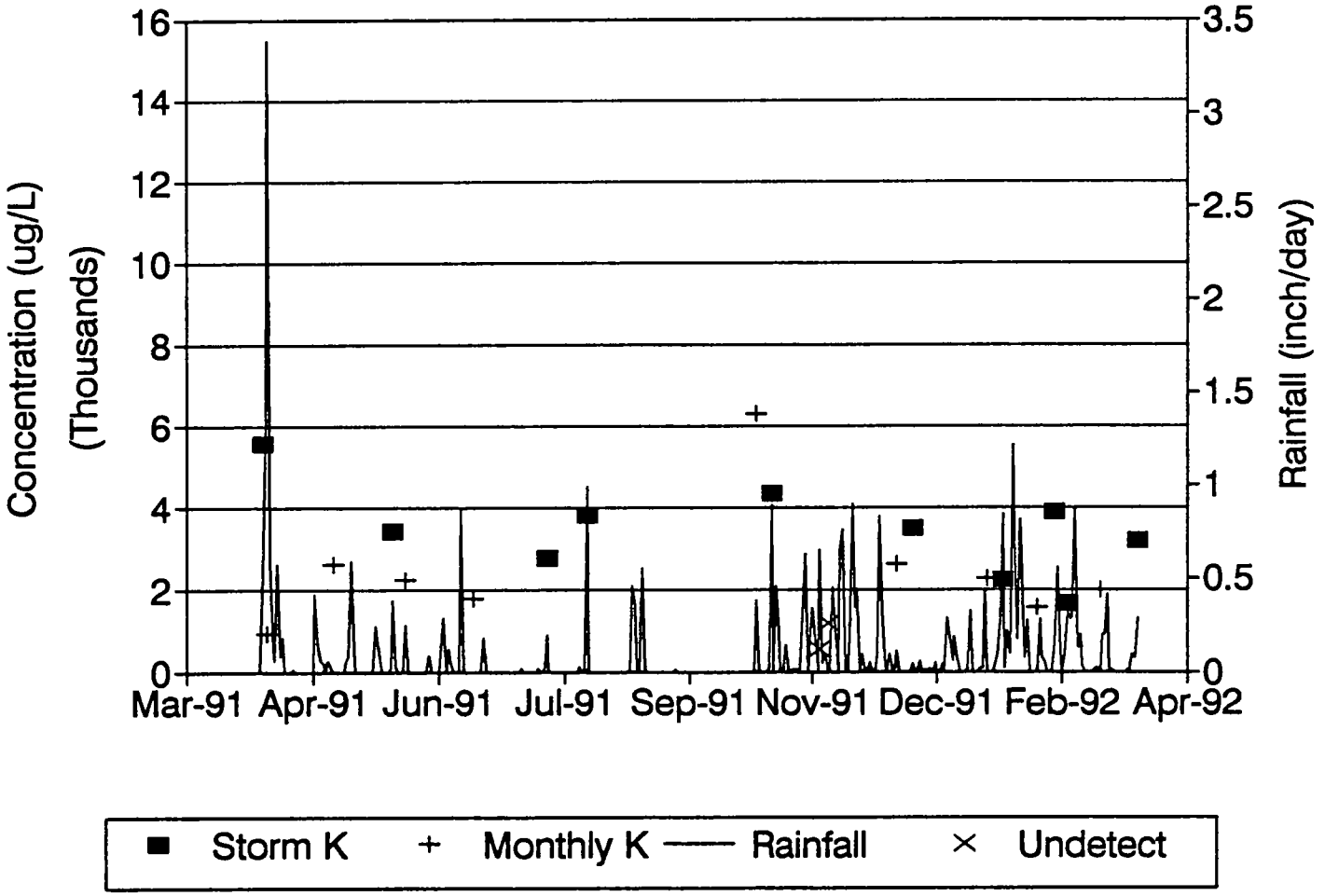
NICKEL (Ni) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2501



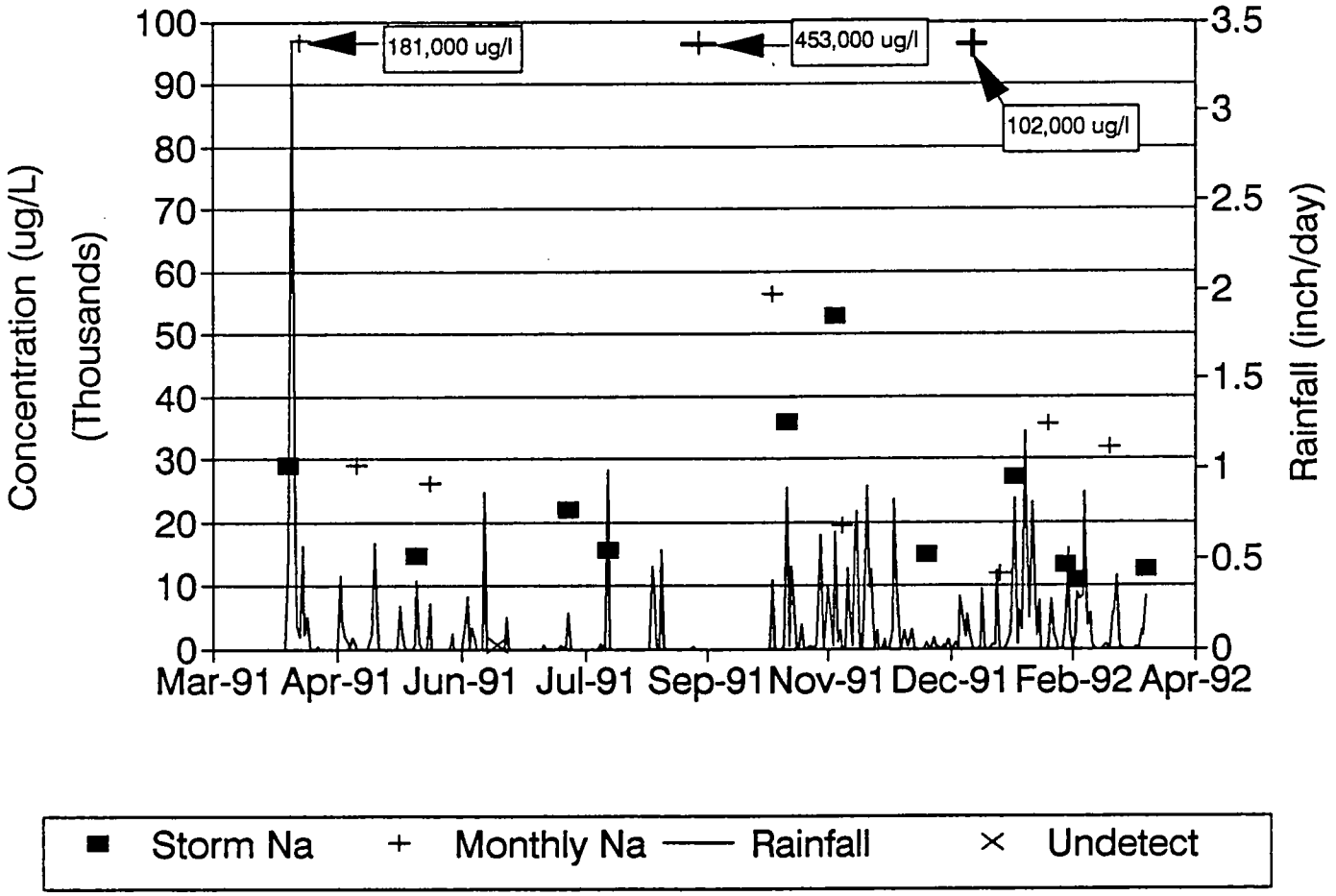
POTASSIUM (K) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2500



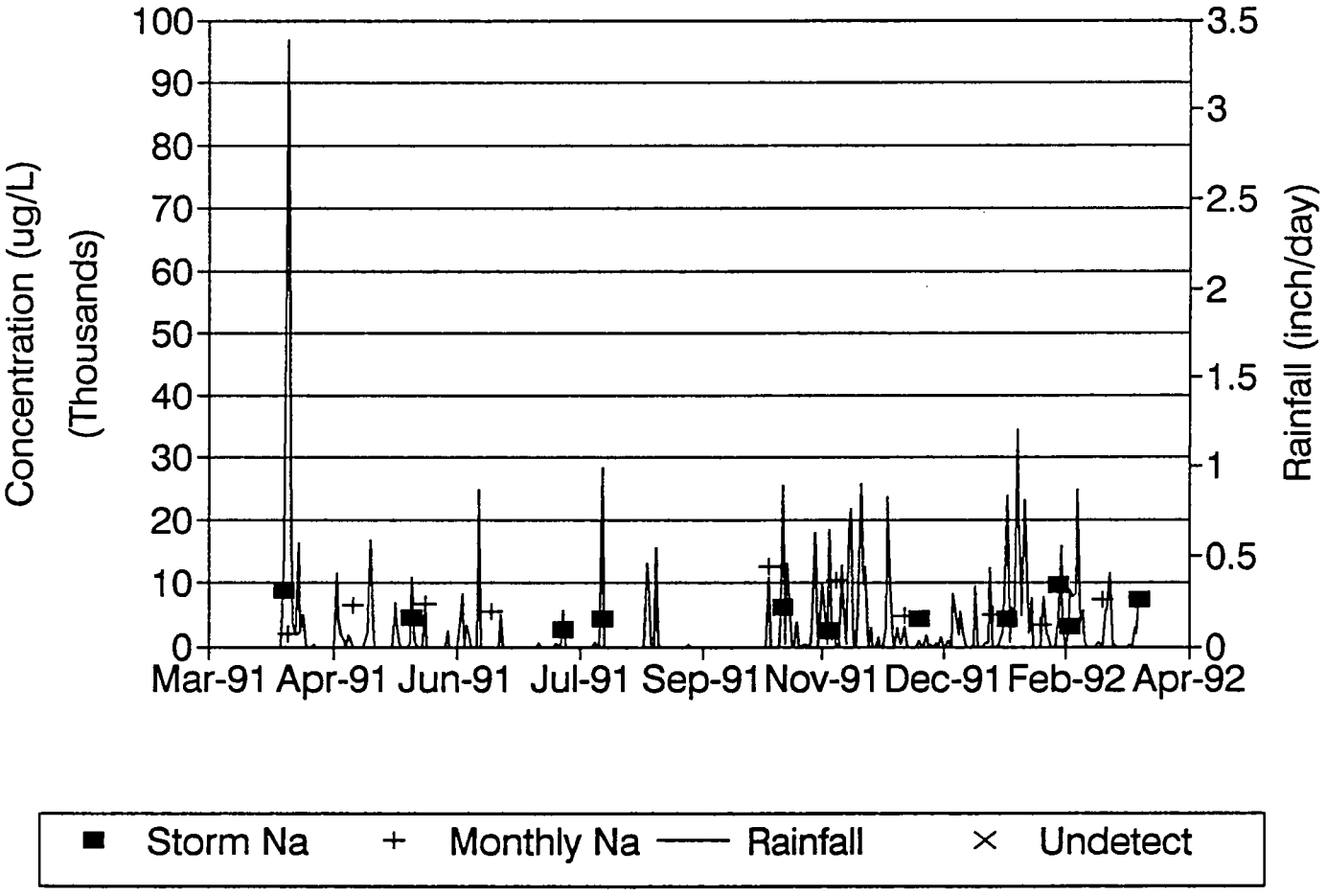
POTASSIUM (K) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2501



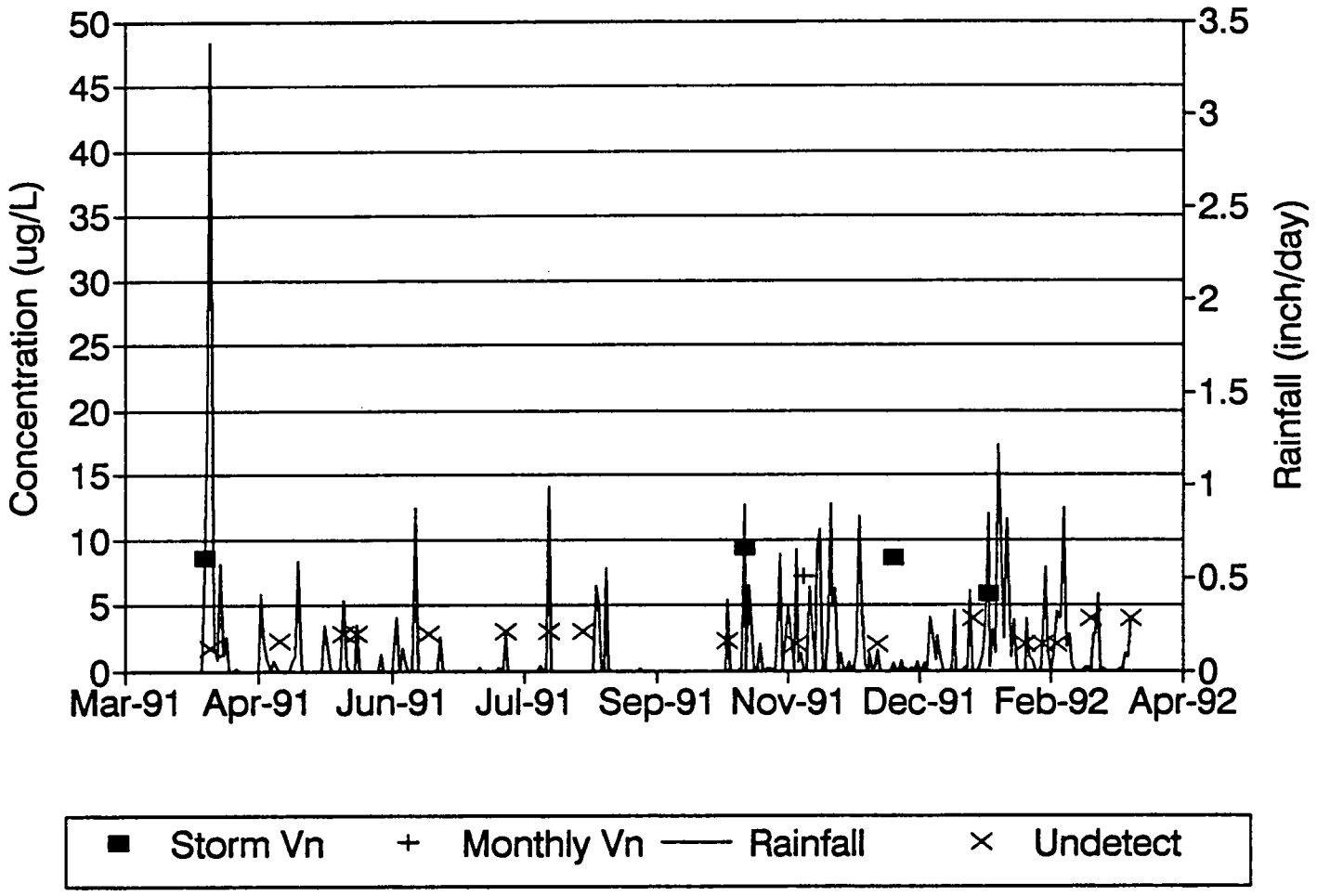
SODIUM (Na) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2500



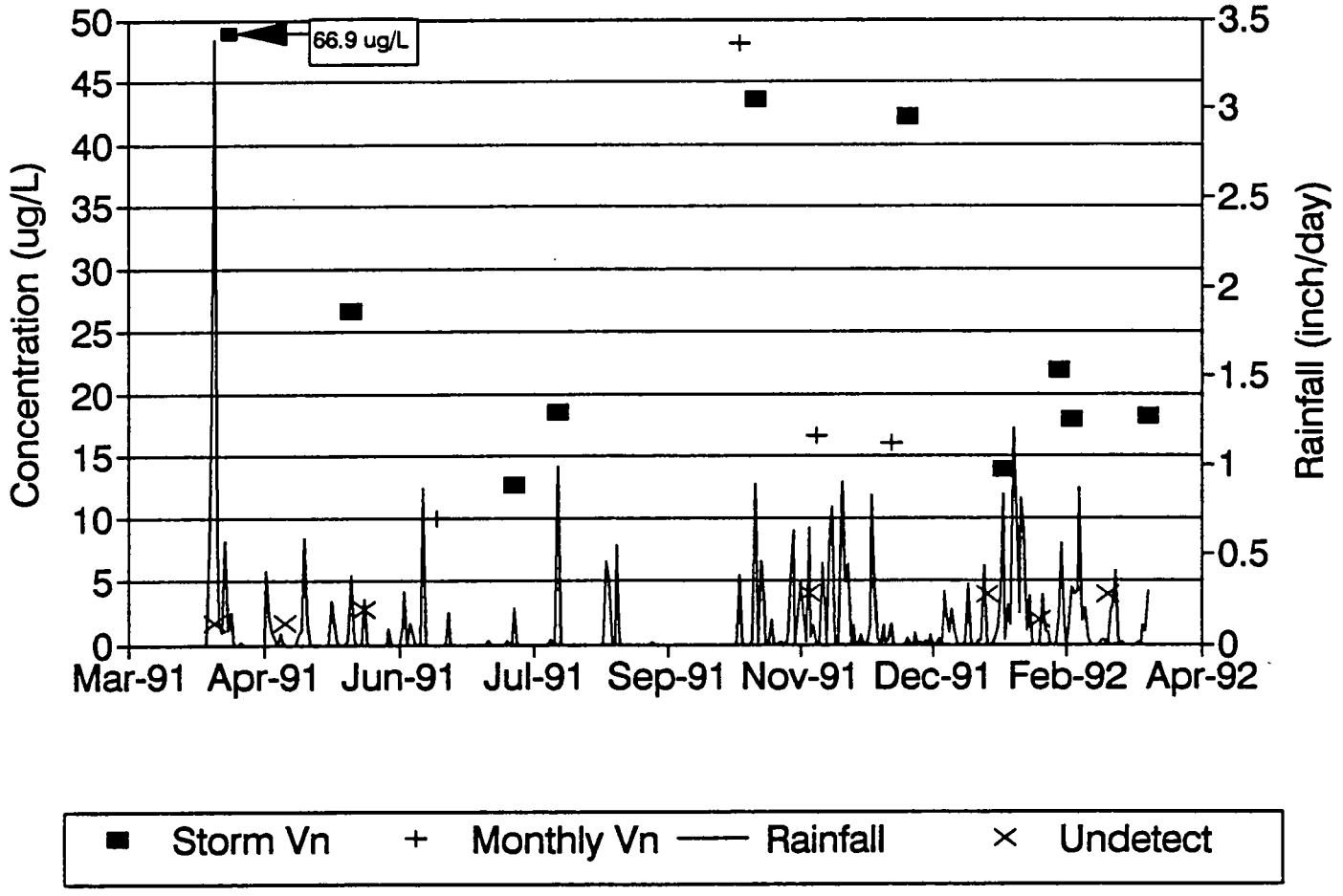
SODIUM (Na) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2501



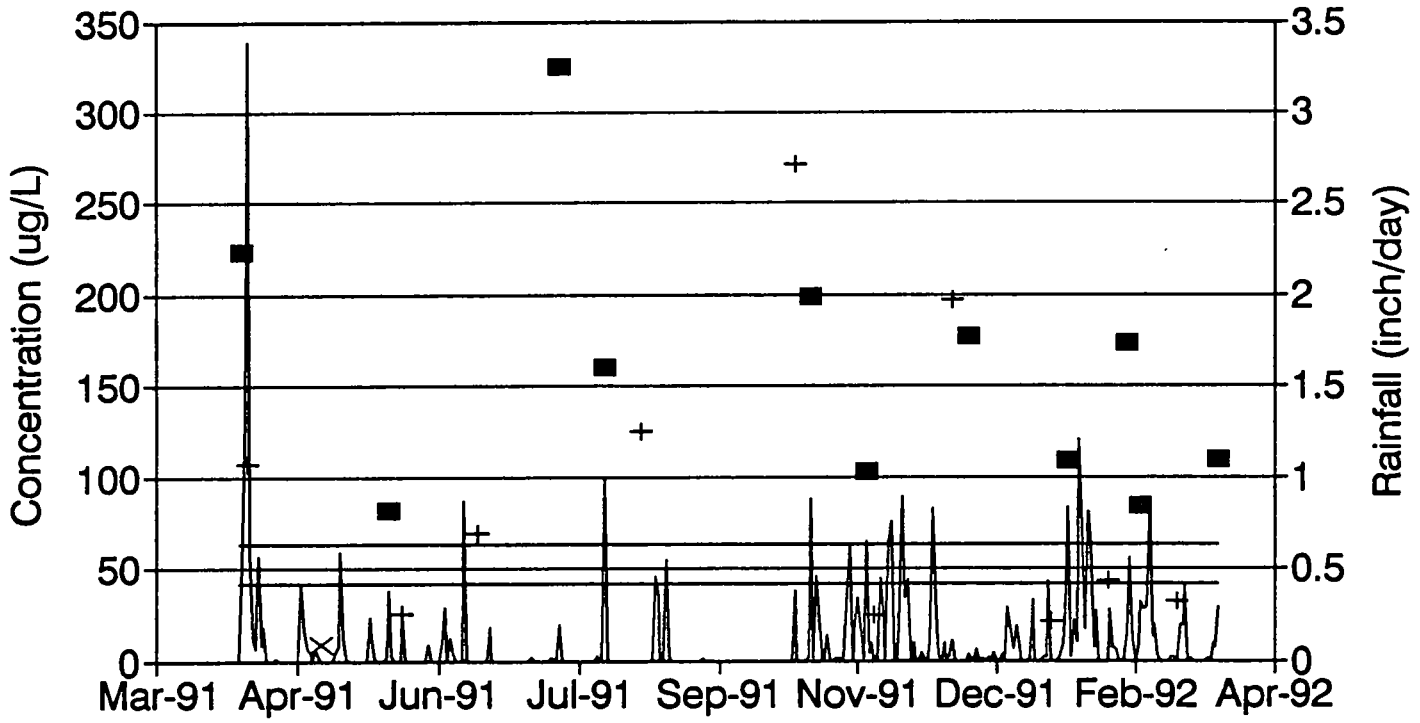
VANADIUM (Vn) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2500



VANADIUM (Vn) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2501



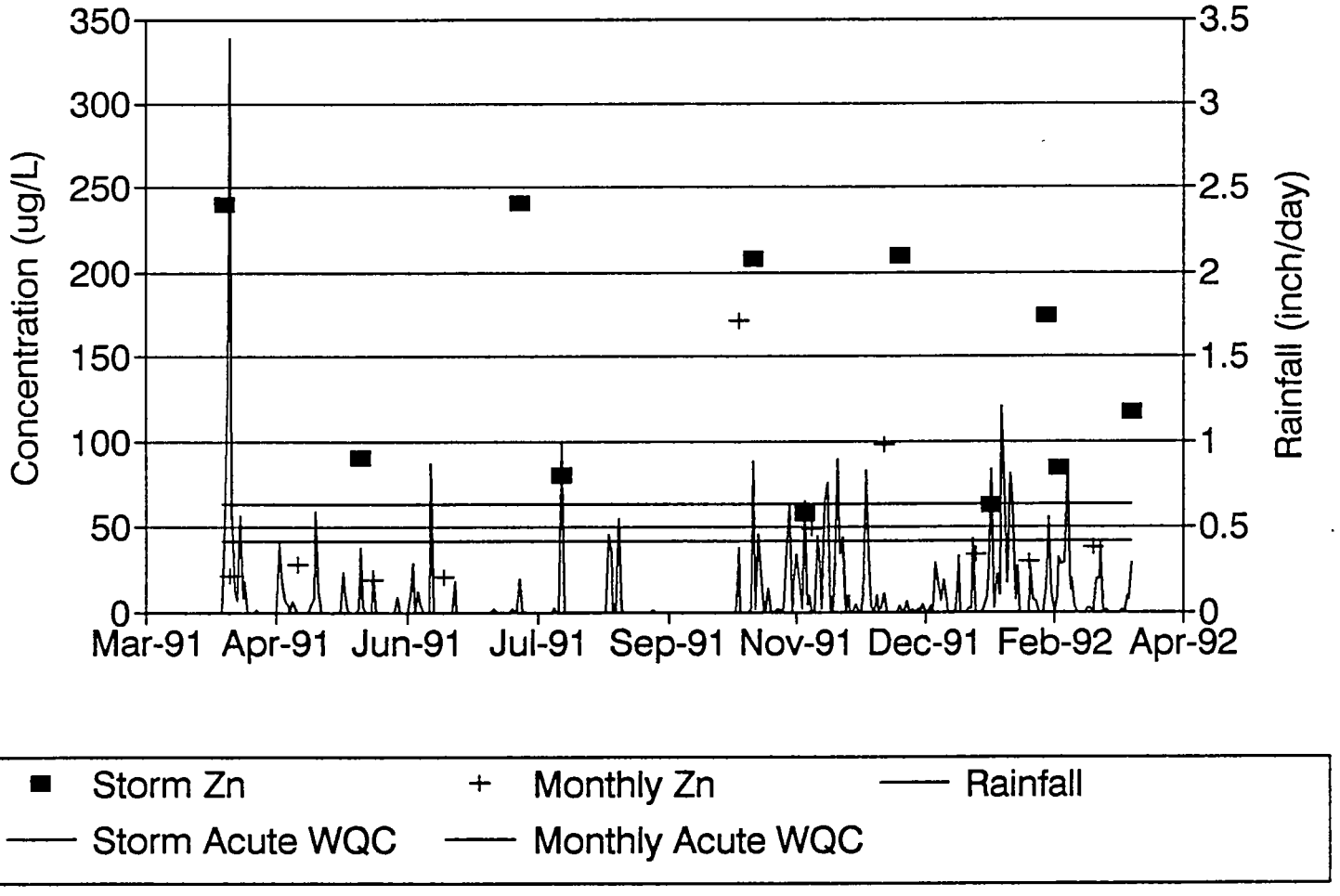
ZINC (Zn) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2500



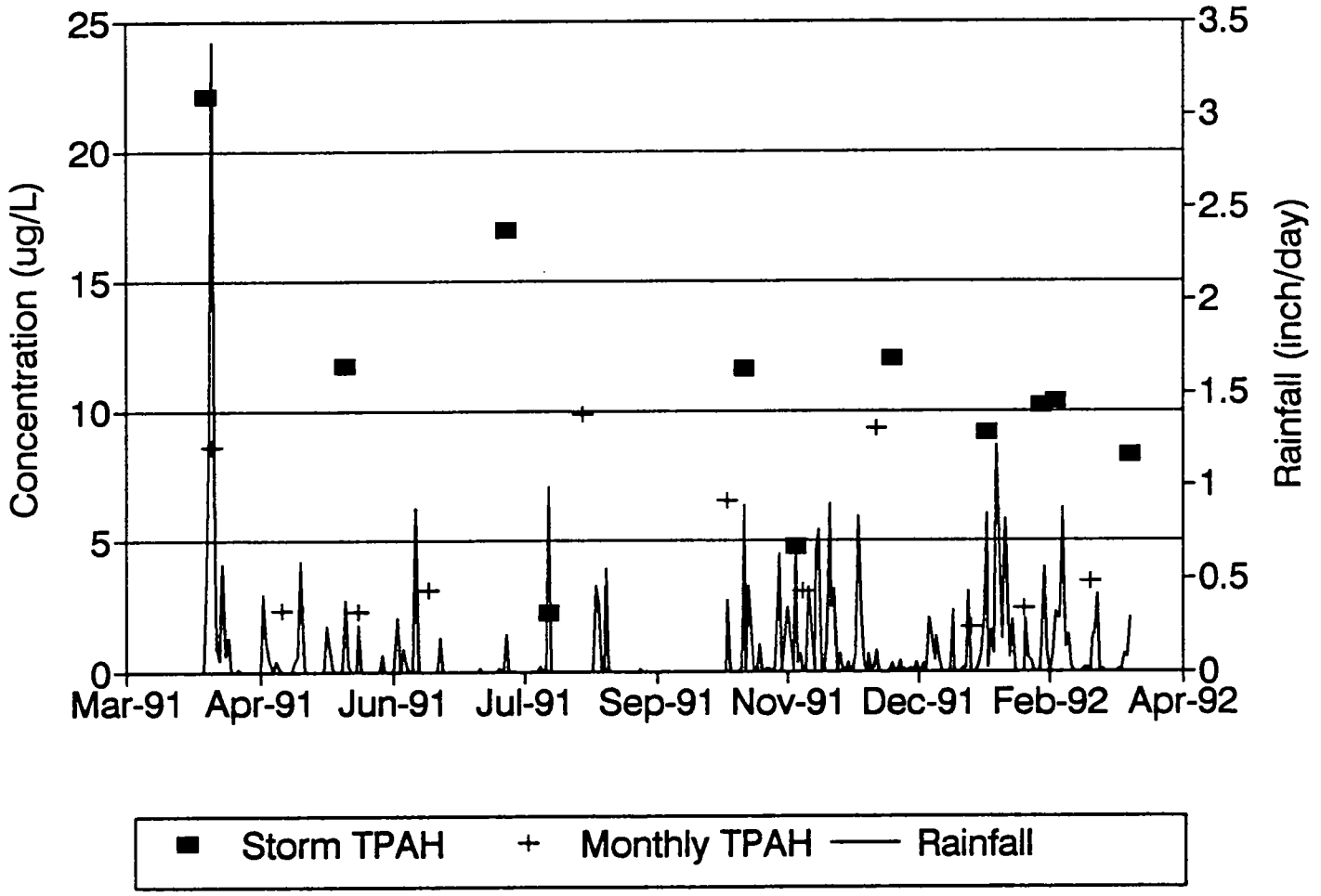
■ Storm Zn + Monthly Zn —— Rainfall

—— Storm Acute WQC —— Monthly Acute WQC × Undetect

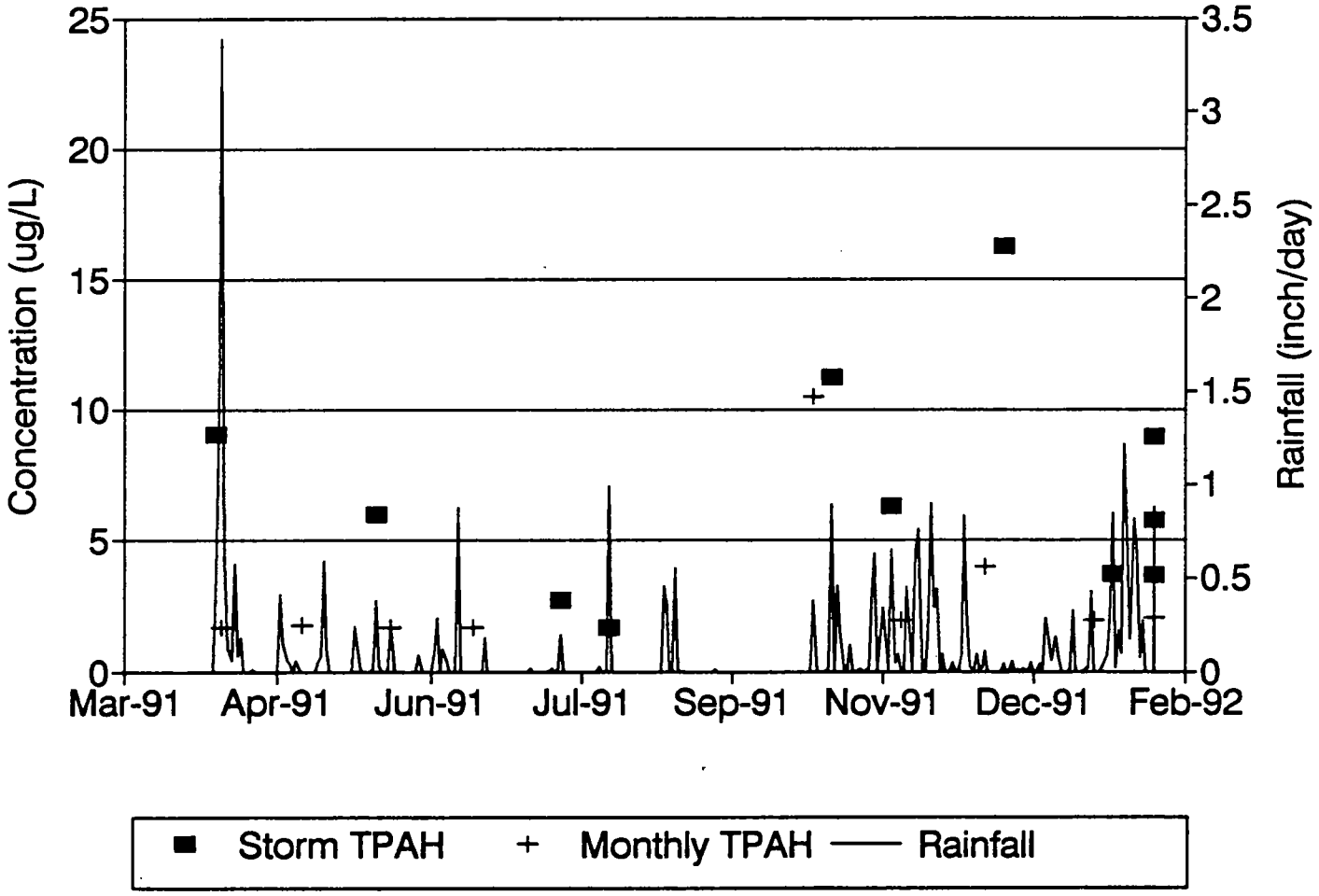
ZINC (Zn) CONCENTRATION IN SURFACE WATER RUNON AT LOCATION 2501



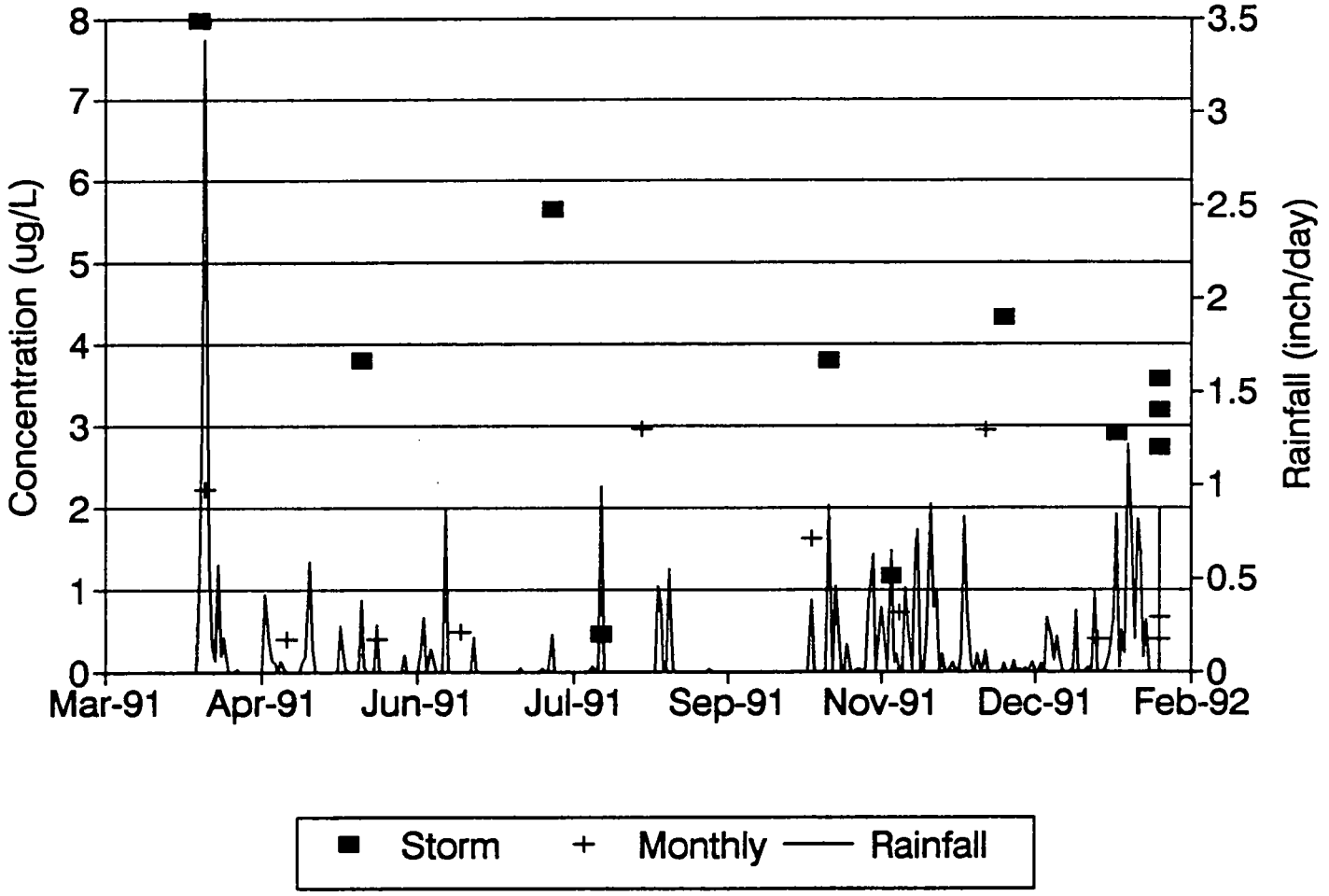
TOTAL PAH (TPAH) CONCENTRATIONS IN SURFACE WATER RUNON AT LOCATION 2500



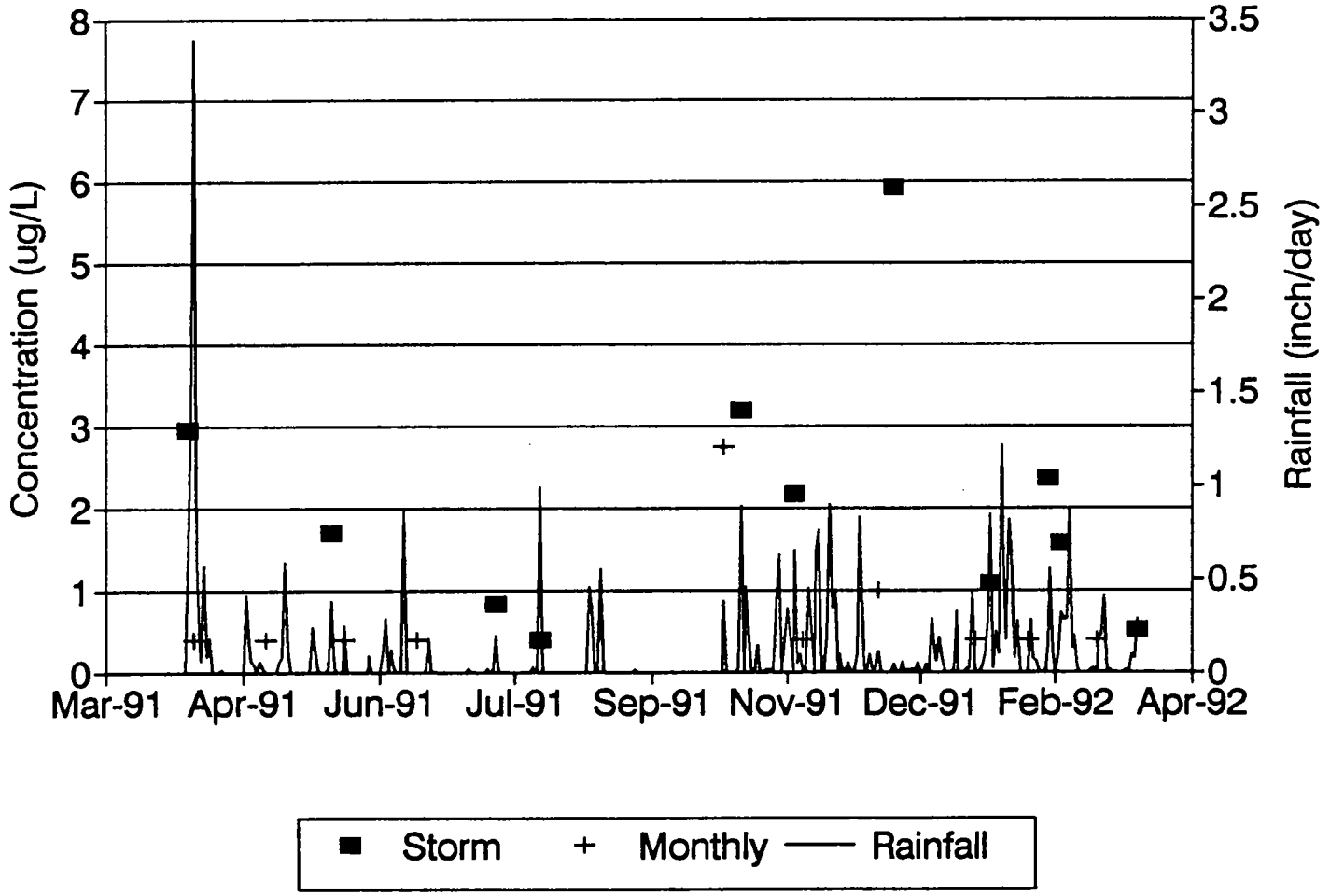
TOTAL PAH (TPAH) CONCENTRATIONS IN SURFACE WATER RUNON AT LOCATION 2501



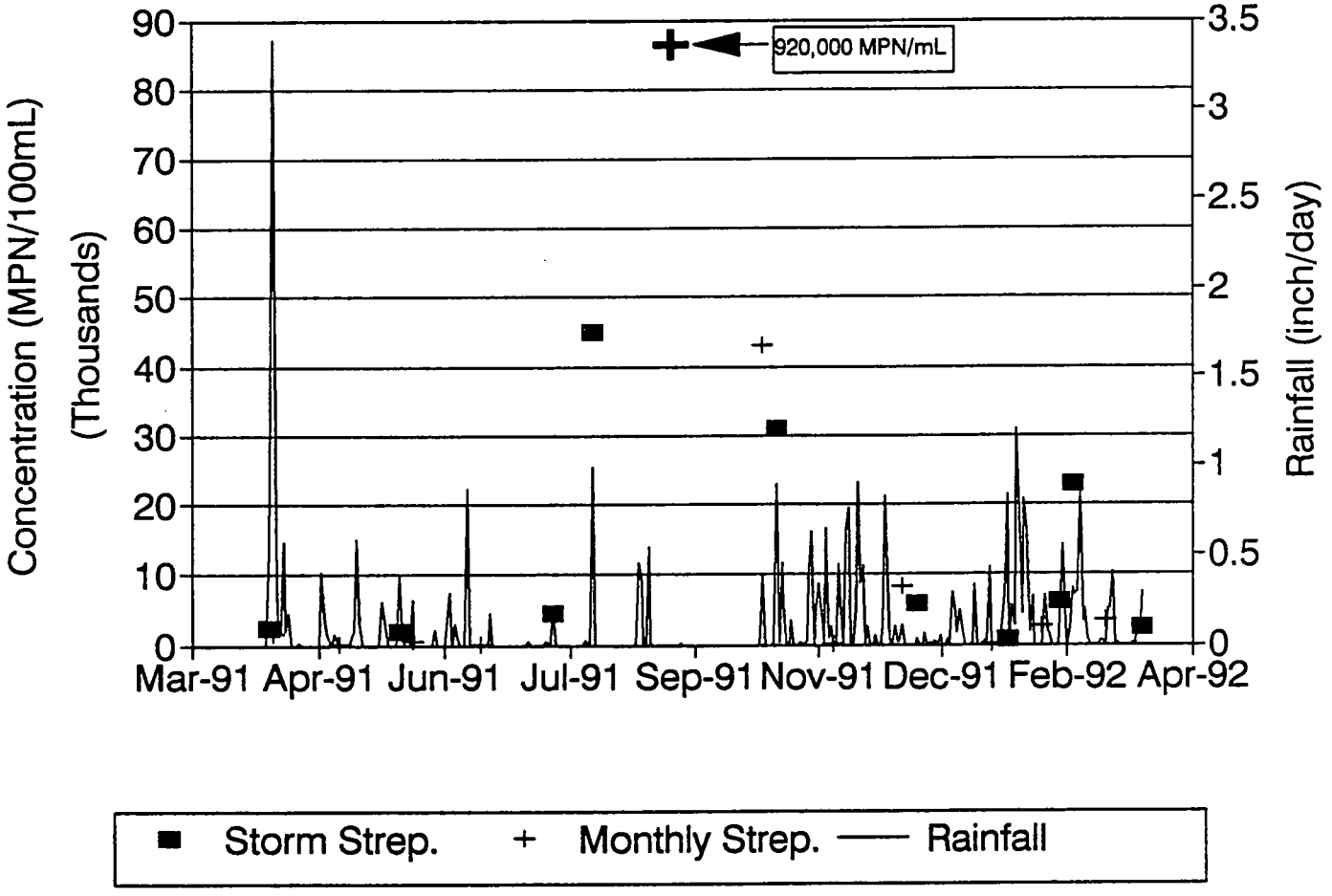
CARCINOGINC PAH (CPAH) CONCENTRATIONS IN SURFACE WATER RUNON AT LOCATION 2500



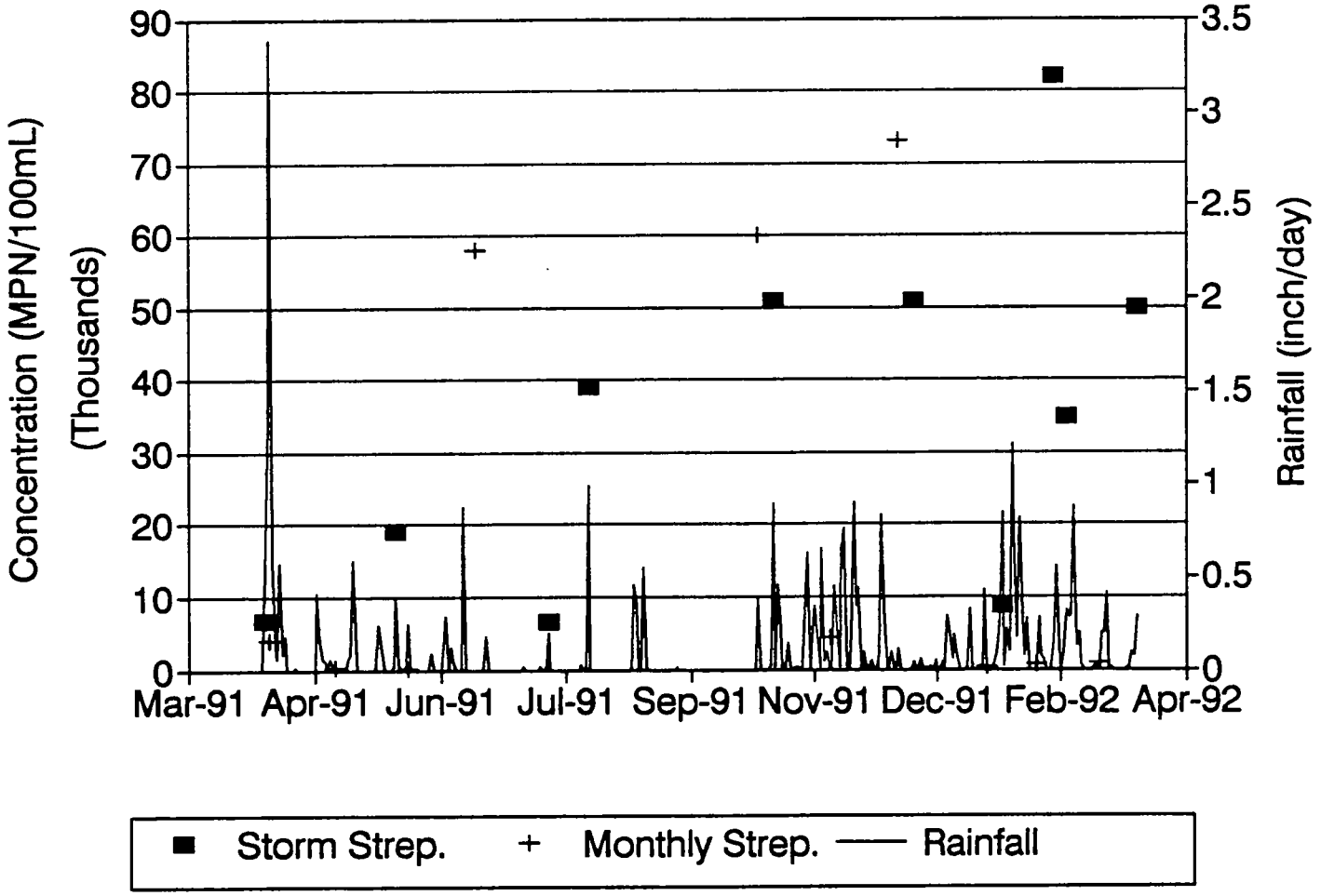
CARCINOGINC PAH (CPAH) CONCENTRATIONS IN SURFACE WATER RUNON AT LOCATION 2501



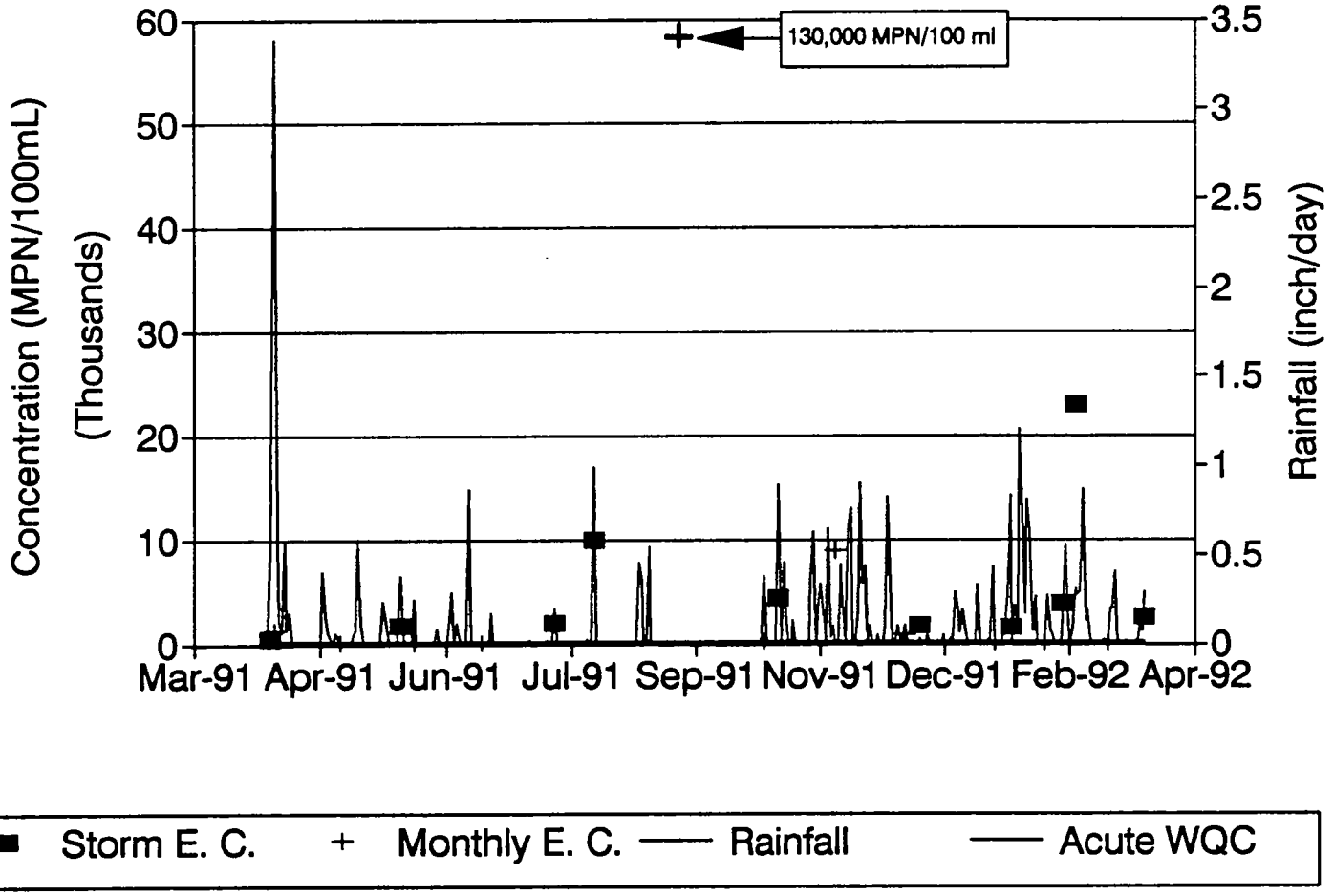
FECAL STREPTOCOCCI CONCENTRATIONS IN SURFACE WATER RUNON AT LOCATION 2500



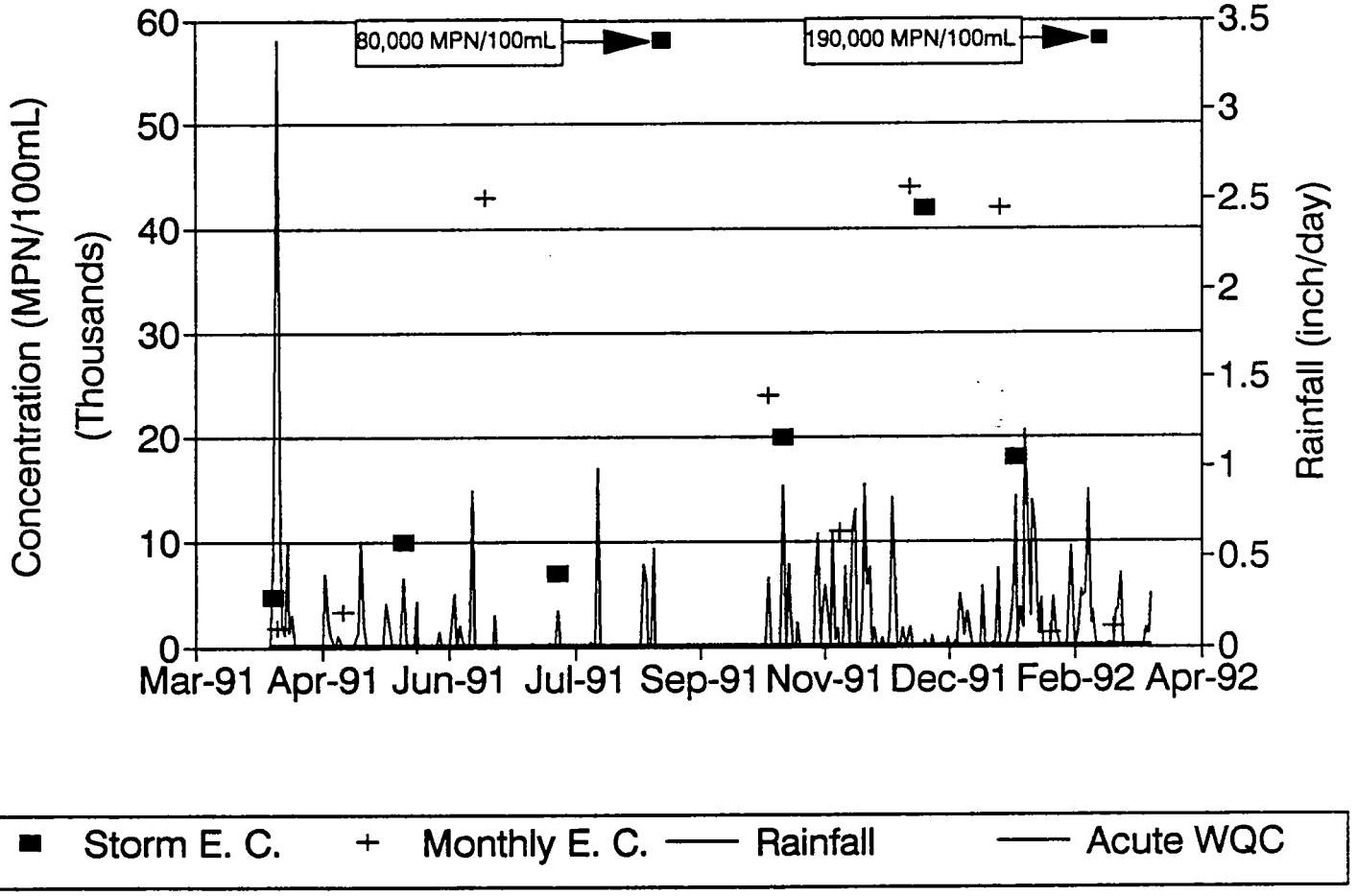
FECAL STREPTOCOCCI CONCENTRATIONS IN SURFACE WATER RUNON AT LOCATION 2501



FECAL COLIFORM CONCENTRATIONS IN SURFACE WATER RUNON AT LOCATION 2500



FECAL COLIFORM CONCENTRATIONS IN SUFACE WATER RUNON AT LOCATION 2501



APPENDIX SW-C

MASS LOADING ESTIMATIONS FOR SURFACE WATER RUNON

STF - SURFACE WATER
RUNON MASS LOADING
ALUMINUM

8 May 1992
K/J 9160055.10
RUNONV2.MCD

PURPOSE

The purpose of these calculations is to determine mass of chemicals that is transported to the South Tacoma Field surface water by runon. Monthly and storm event water samples were collected from sampling points 2500 (near pump station) and 2501 (South 38th St. storm drain). Based on the concentration of chemicals found in these samples and the estimated runon flowrate the mass of chemical loading is estimated.

RUNON ESTIMATE

Runon will be estimated using the rational method. The rational method was selected because of its simplicity. The rational formula is as follows:

$$Q := C \cdot I \cdot A_{\square}$$

Where

Q=flowrate
C=runoff coefficient
I=rainfall intensity
A=area

The basin that drains to the South Tacoma Field is divided into two sub-basins. Sub-basin #1 discharges at sampling point 2500 and sub-basin #2 discharges at sampling point 2501. The area for each basin was determined from maps and runoff coefficients were estimated based on land use, soil characteristics, and field investigation. The land uses identifed in the drainage basins are; single-family residential (SF), multi-family residential (MF), commercial (CM), industrial (ID), and open space (OS). Daily rainfall data was obtained from McChord Air Force base.

SUB-BASIN RUNOFF COEFFICIENTS

Area & Land use

Basin #1	Basin #2	Land Use
OS1 := 41·acre	OS2 := 11·acre	open space
SF1 := 51·acre	SF2 := 124·acre	single-family
MF1 := 19·acre	MF2 := 24·acre	multi-family
CM1 := 92·acre	CM2 := 6·acre	commercial
ID1 := 59·acre	ID2 := 0·acre	industrial

$A1 := OS1 + SF1 + MF1 + CM1 + ID1$

$A2 := OS2 + SF2 + MF2 + CM2 + ID2$

$A1 = 262 \cdot acre$ total area Basin #1 (2500)

$A2 = 165 \cdot acre$ total area Basin #2 (2501)

Runoff Coefficients

The Federal Highway Administration developed the following equation for runoff coefficient estimation.

$$C := 0.007 \cdot IMP + 0.1$$

where

C=runoff coefficient
IMP=percent impervious area (%)

The following is a table of typical values of percent impervious for various land use types.

LAND USE	% IMPERVIOUS RANGE
open space	5-15
single-family	20-30
multi-family	35-55
commercial	60-70
industrial	70-80

Soil types in the area are highly permeable. For this reason, the lowest % impervious range of each land use type will be used.

$IMPos := 5 \cdot \%$	$Cos := 0.007 \cdot IMPos \cdot 100 + 0.1$	open space
$IMPsf := 20 \cdot \%$	$Csf := 0.007 \cdot IMPsf \cdot 100 + 0.1$	single-family
$IMPmf := 35 \cdot \%$	$Cmf := 0.007 \cdot IMPmf \cdot 100 + 0.1$	multi-family
$IMPcm := 60 \cdot \%$	$Ccm := 0.007 \cdot IMPcm \cdot 100 + 0.1$	commercial
$IMPid := 70 \cdot \%$	$Cid := 0.007 \cdot IMPid \cdot 100 + 0.1$	industrial

$Cos = 14 \cdot \%$ $Csf = 24 \cdot \%$ $Cmf = 35 \cdot \%$

$Ccm = 52 \cdot \%$ $Cid = 59 \cdot \%$

Composite Basin Runoff Coefficients

$$C1 := \frac{(OS1 \cdot Cos + SF1 \cdot Csf + MF1 \cdot Cmf + CM1 \cdot Ccm + ID1 \cdot Cid)}{A1}$$

$$C2 := \frac{(OS2 \cdot Cos + SF2 \cdot Csf + MF2 \cdot Cmf + CM2 \cdot Ccm + ID2 \cdot Cid)}{A2}$$

$C1 = 41 \cdot \%$ basin #1 (2500)

$C2 = 26 \cdot \%$ basin #2 (2501)

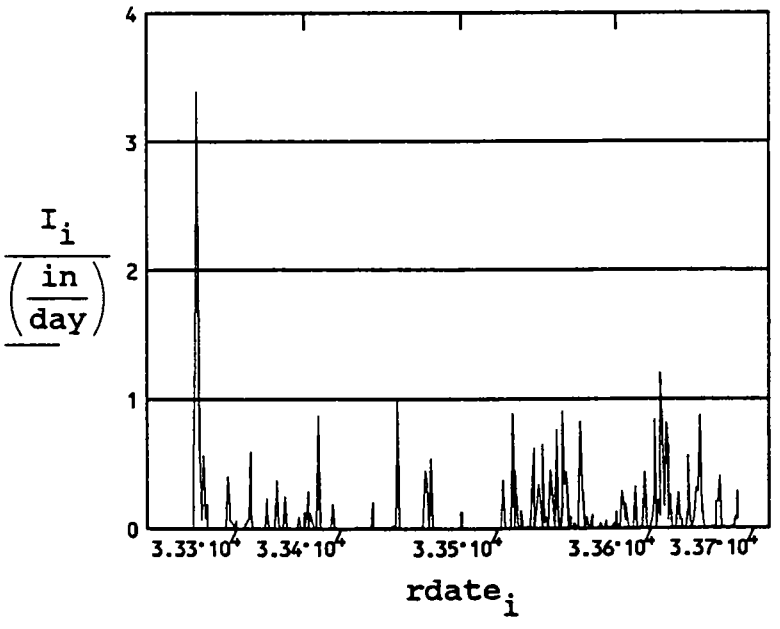
$C2 := 50 \cdot \% \cdot C2$ $C2 = 13 \cdot \%$ basin #2 (2501)

NOTE: The runoff coefficient for basin #2 was reduced 50%, because a field investigation of the area revealed a number of areas that act as closed depressions and areas that appeared significantly more permeable than "typical". Thus reducing the runon contributed by sub-basin #2

RAINFALL INTENSITY

ORIGIN ≡ 1	define matrice origin as 1
Rain := READPRN(daterain)	read date-rainfall intensity data file
rdate := $Rain^{<1>}$	rainfall date
$I := Rain^{<2>} \cdot \frac{in}{day}$	rainfall intensity
N := length(rdate)	number of rainfall records
i := 1 .. N	

GRAPH OF RAINFALL INTENSITY Vs. JULIAN DATE



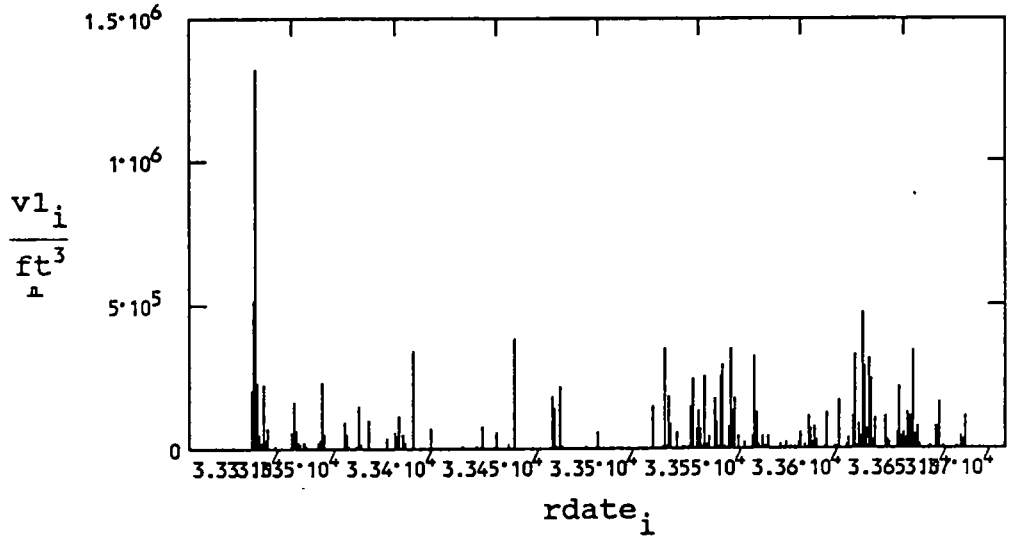
RUNON VOLUME PER DAY

$v1_i := C1 \cdot I_i \cdot A1 \cdot (1 \cdot day)$ runon volume basin #1 (2500)

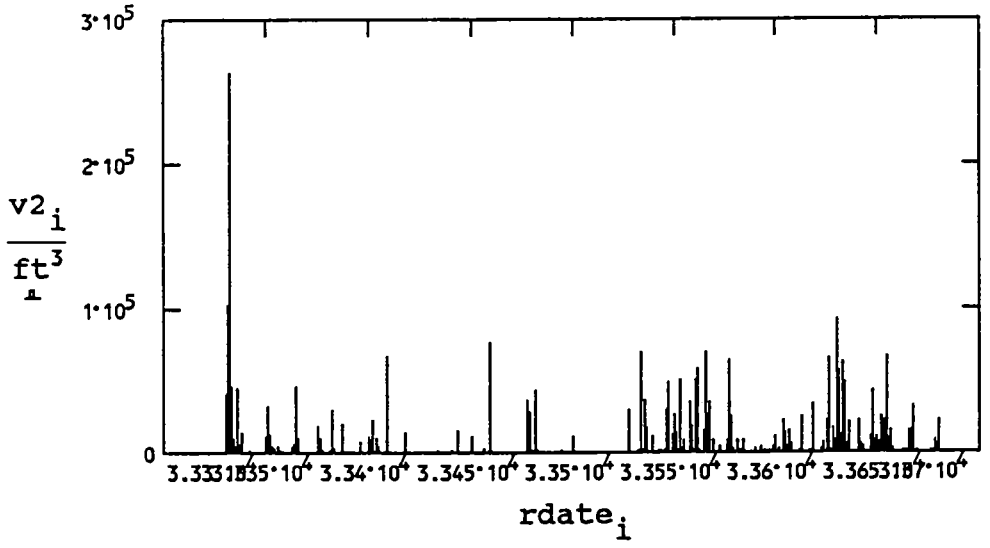
$v2_i := C2 \cdot I_i \cdot A2 \cdot (1 \cdot day)$ runon volume basin #2 (2501)

GRAPHS OF RUNON VOLUME

2500



2501



TOTAL VOLUME OF RUNON

$V1 := \sum_i v1_i$ $V1 = 1.052 \cdot 10^8 \cdot gal$

$V2 := \sum_i v2_i$ $V2 = 2.097 \cdot 10^7 \cdot gal$

RUNON MASS

The runon mass is equal to the runon volume times the concentration of the chemical in the water. Water samples were collected and analyzed monthly and for storm events. It will be assumed that the concentration found in monthly samples is indicative of the day to day concentration and the concentration found in storm event samples is representive of the storm event only. It will be assumed that the concentration before and after a monthly sampling event is constant. Storm events will be assumed to last 1 day (actual storm events ranged from 18-36 hr).

Monthly Sample Data

CONCM := READPRN(al_m) — read monthly date-chemical concentration file

mdate := $CONCM^{\langle 1 \rangle}$ — sample date

ug := $1 \cdot 10^{-6} \cdot gm$ — define micrograms

mc2500 := $CONCM^{\langle 2 \rangle} \cdot \frac{ug}{liter}$ — chemical concentration at sampling point 2500

mc2501 := $CONCM^{\langle 3 \rangle} \cdot \frac{ug}{liter}$ — chemical concentration at sampling point 2501

M := length(mc2500) — number of samples taken

j := 1..M

Storm Sampling Data

CONCS := READPRN(al_s) — read storm date-chemical concentration file

sdate := $CONCS^{\langle 1 \rangle}$ — sample date

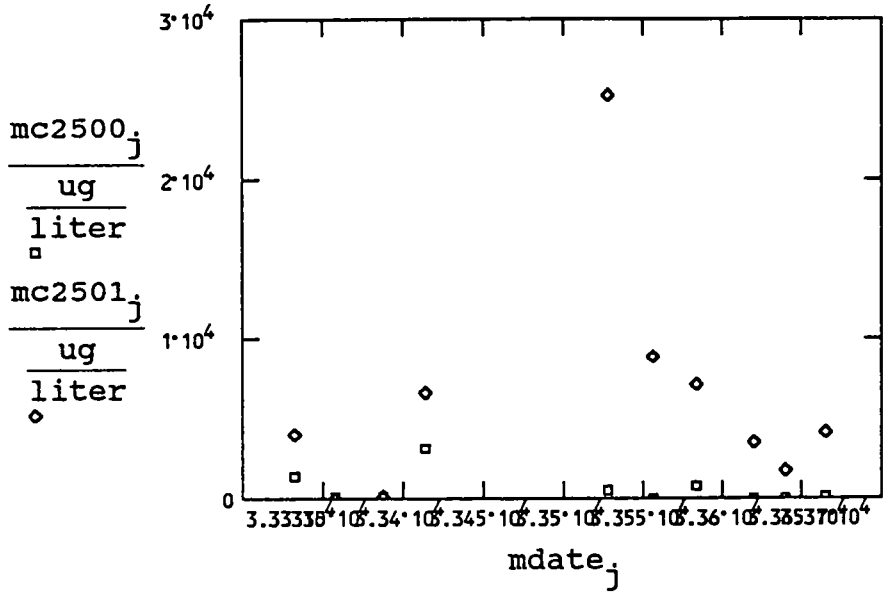
sc2500 := $CONCS^{\langle 2 \rangle} \cdot \frac{ug}{liter}$ — chemical concentration at sampling point 2500

sc2501 := $CONCS^{\langle 3 \rangle} \cdot \frac{ug}{liter}$ — chemical concentration at sampling point 2501

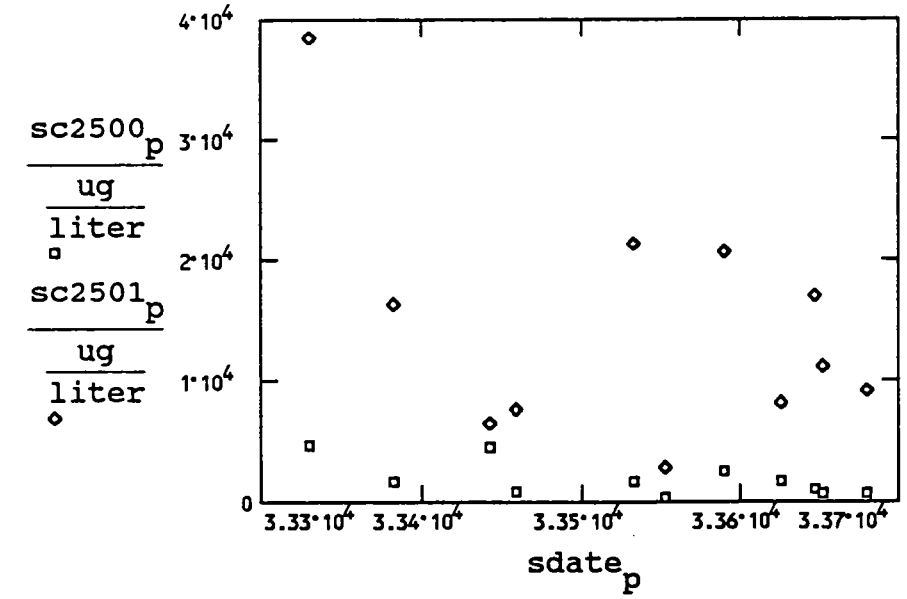
S := length(sc2500) — number of samples taken

p := 1..S

GRAPH OF MONTHLY CHEMICAL CONCENTRATION Vs. JULIAN DATE



GRAPH OF STORM CHEMICAL CONCENTRATION Vs. JULIAN DATE



DEFINE MONTHLY CONCENTRATION FOR UN-SAMPLED DATES (2500)

$k := 2 .. M - 1$

$$Imc2500_{(i,1)} := if\left(rdate_i \le \frac{mdate_2 + mdate_1}{2}, mc2500_1, 0 \cdot \frac{ug}{liter}\right)$$

$$Mmc2500_{(i,k)} := if\left[rdate_i > \left[\frac{mdate_k + mdate_{(k-1)}}{2}\right], if\left[rdate_i \le \left[\frac{mdate_{(k}\right.\right.\right.$$

$Mmc2500VT := Mmc2500^T$ $\quad Mmcd2500_i := \sum Mmc2500VT^{<i>}$

$$Emc2500_{(i,M)} := if\left[rdate_i > \left[\frac{mdate_M + mdate_{(M-1)}}{2}\right], mc2500_M, 0 \cdot \frac{ug}{liter}\right]$$

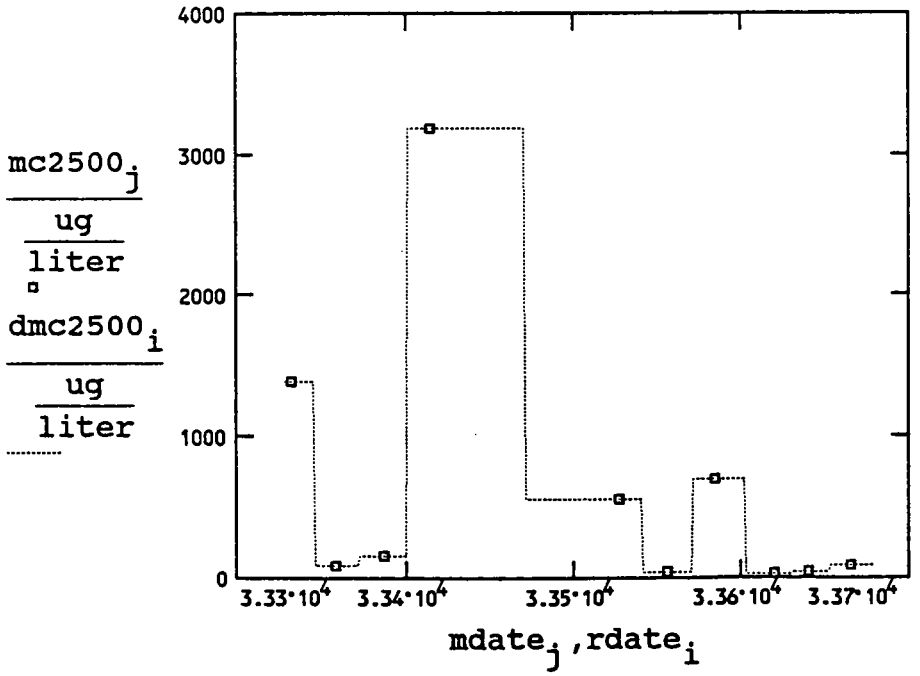
$Emc2500VT := Emc2500^T$ $\quad Emcd2500_i := \sum Emc2500VT^{<i>}$

$mc2500V := augment(Imc2500, augment(Mmcd2500, Emcd2500))$

$mc2500VT := mc2500V^T$

$dmc2500_i := \sum mc2500VT^{<i>}$

GRAPH OF SAMPLED CONCENTRATIONS AND DEFINED CONCENTRATION (2500)



DEFINE MONTHLY CONCENTRATION FOR UN-SAMPLED DATES (2501)

$k := 2 .. M - 1$

$$Imc2501_{(i,1)} := if\left(rdate_i \le \frac{mdate_2 + mdate_1}{2}, mc2501_1, 0 \cdot \frac{ug}{liter}\right)$$

$$Mmc2501_{(i,k)} := if\left[rdate_i > \left[\frac{mdate_k + mdate_{(k-1)}}{2}\right], if\left[rdate_i \le \left[\frac{mdate_{(k}\right.\right.\right.$$

$$Mmc2501VT := Mmc2501^T \qquad Mmcd2501_i := \sum Mmc2501VT^{<i>}$$

$$Emc2501_{(i,M)} := if\left[rdate_i > \left[\frac{mdate_M + mdate_{(M-1)}}{2}\right], mc2501_M, 0 \cdot \frac{ug}{liter}\right]$$

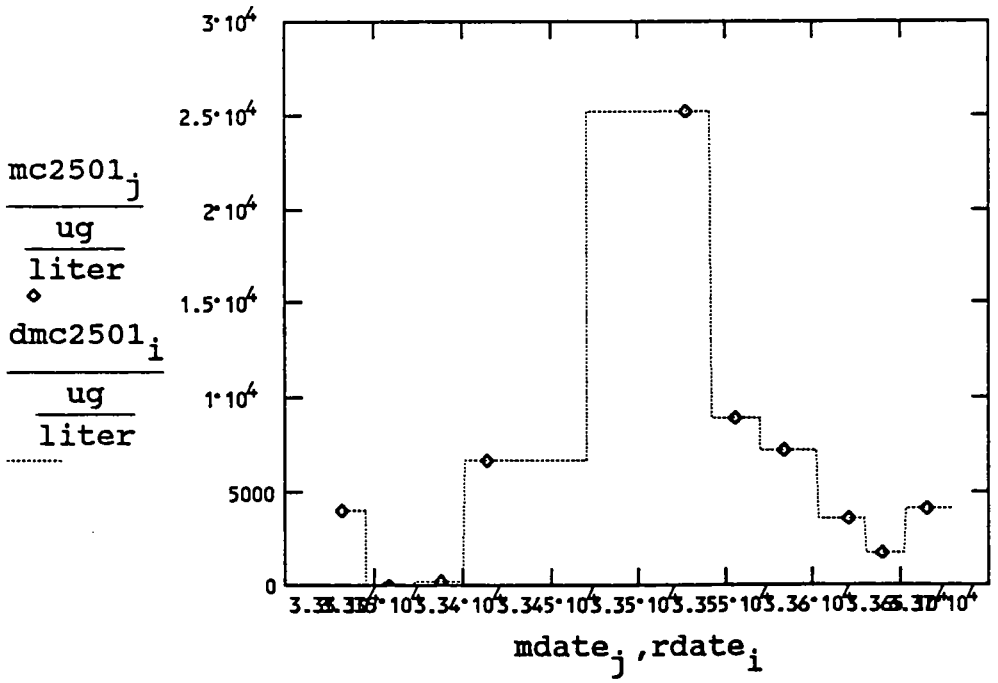
$$Emc2501VT := Emc2501^T \qquad Emcd2501_i := \sum Emc2501VT^{<i>}$$

$$mc2501V := augment(Imc2501, augment(Mmcd2501, Emcd2501))$$

$$mc2501VT := mc2501V^T$$

$$dmc2501_i := \sum mc2501VT^{<i>}$$

GRAPH OF SAMPLED CONCENTRATIONS AND DEFINED CONCENTRATION (2501)



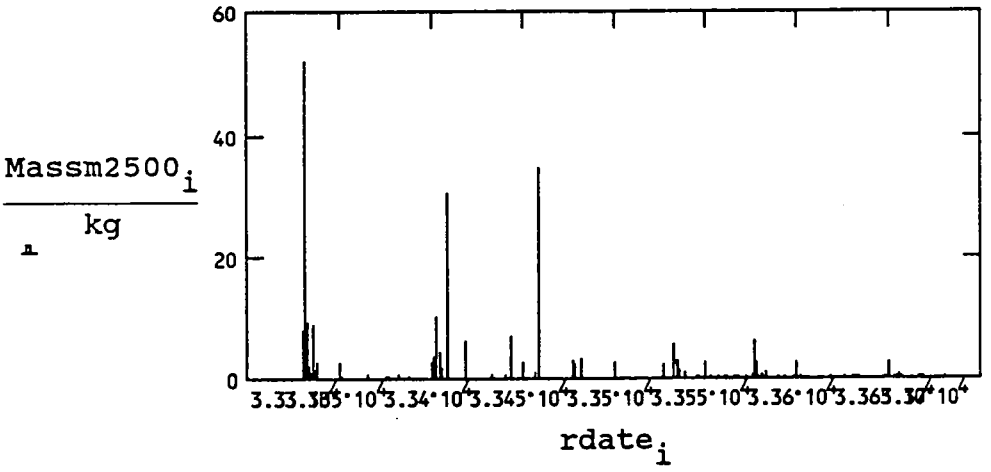
MASS LOADING-monthly

$$Massm2500_i := v1_i \cdot dmc2500_i$$

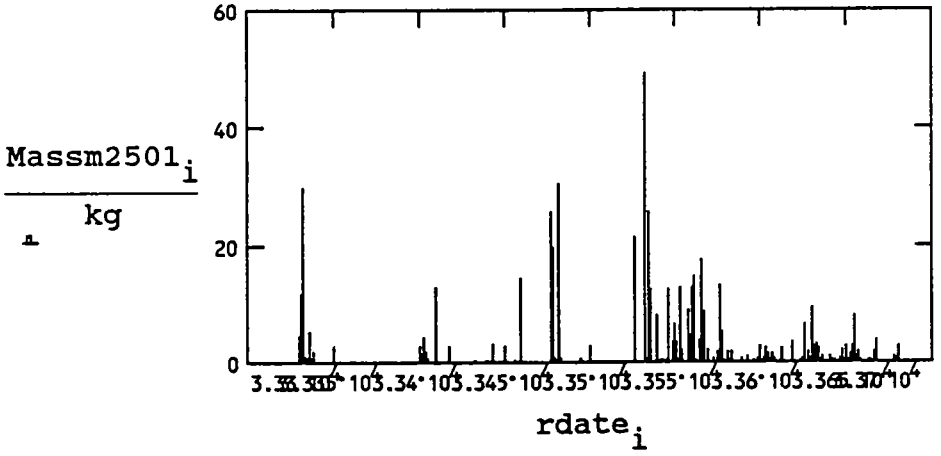
$$Massm2501_i := v2_i \cdot dmc2501_i$$

GRAPHS OF MASS LOADING

2500



2501



MASS LOADING-MONTHLY

$$Totalm2500 := \left(\sum_i Massm2500_i\right) \quad Totalm2500 = 254 \cdot kg$$ <---

$$Totalm2501 := \left(\sum_i Massm2501_i\right) \quad Totalm2501 = 531 \cdot kg$$ <---

MASS LOADING-TOTAL(Monthly & Storm)

DEFINE TOTAL CHEMICAL CONCENTRATION (2500)

$$zerosc2500_{(i,p)} := if\left(rdate_i = sdate_p, sc2500_p, 0 \cdot \frac{ug}{liter}\right)$$

$$zerosc2500VT := zerosc2500^T$$

$$Zerosc2500_i := \sum zerosc2500VT^{<i>}$$

$$dtc2500_i := if\left(Zerosc2500_i > dmc2500_i, Zerosc2500_i, dmc2500_i\right)$$

DEFINE TOTAL CHEMICAL CONCENTRATION (2500)

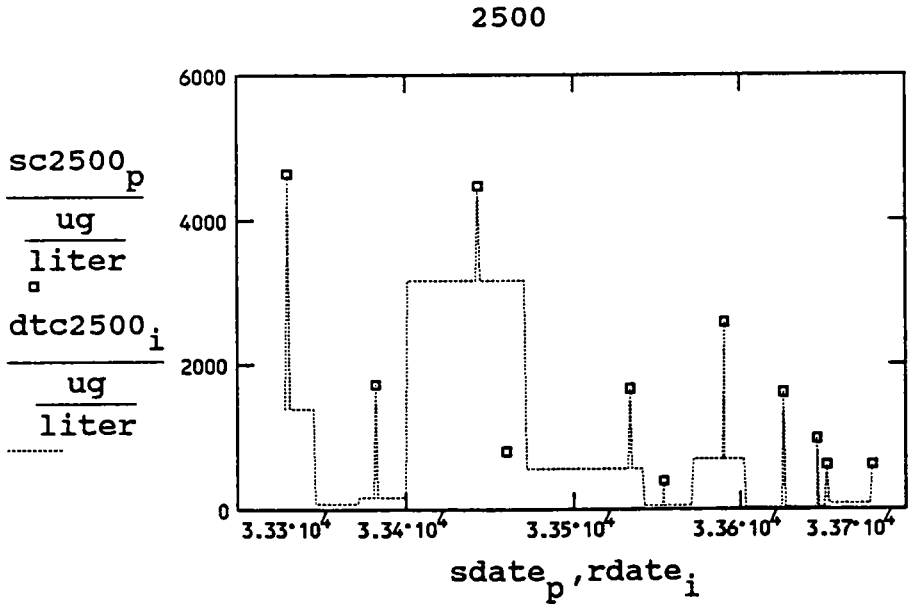
$$zerosc2501_{(i,p)} := if\left(rdate_i = sdate_p, sc2501_p, 0 \cdot \frac{ug}{liter}\right)$$

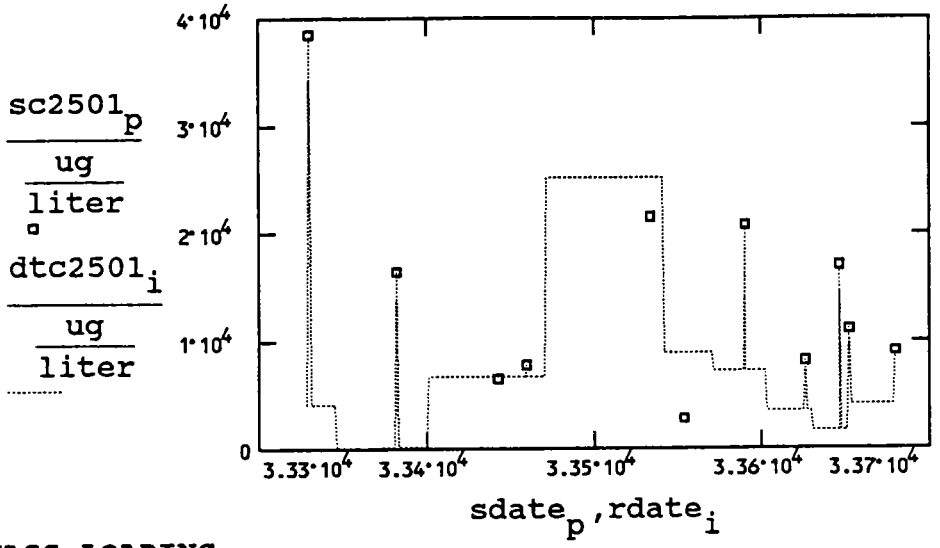
$$zerosc2501VT := zerosc2501^T$$

$$Zerosc2501_i := \sum zerosc2501VT^{<i>}$$

$$dtc2501_i := if\left(Zerosc2501_i > dmc2501_i, Zerosc2501_i, dmc2501_i\right)$$

GRAPHS OF DEFINED TOTAL CONCENTRATION





TOTAL MASS LOADING

2500

$Masst2500_i := v1_i \cdot dtc2500_i$

$Total2500 := \left(\sum_i Masst2500_i\right)$

$Total2500 = 316 \cdot kg$ <----- total mass runon

$Total2500 - Totalm2500 = 62 \cdot kg$ <----- storm mass runon

2501

$Masst2501_i := v2_i \cdot dtc2501_i$

$Total2501 := \left(\sum_i Masst2501_i\right)$

$Total2501 = 611 \cdot kg$ <----- total mass runon

$Total2501 - Totalm2501 = 80 \cdot kg$ <----- storm mass runon

SUMMARY

STF-SURFACE WATER MASS LOADINGS

INVESTIGATION PERIOD IS N DAYS. N = 352

ALUMINUM

SAMPLING PT 2500

month	total (month & storm)
Totalm2500 = 254 · kg	Total2500 = 316 · kg
Totalm2500 = 560 · lb	Total2500 = 696 · lb

SAMPLING PT 2501

month	total (month & storm)
Totalm2501 = 531 · kg	Total2501 = 611 · kg
Totalm2501 = 1171 · lb	Total2501 = 1347 · lb

SUMMARY

STF-SURFACE WATER MASS LOADINGS

INVESTIGATION PERIOD IS N DAYS. N = 352

ARSENIC

SAMPLING PT 2500

month	total (month & storm)
Totalm2500 = 2 · kg	Total2500 = 2 · kg
Totalm2500 = 4 · lb	Total2500 = 4 · lb

SAMPLING PT 2501

month	total (month & storm)
Totalm2501 = 0.19 · kg	Total2501 = 0.2 · kg
Totalm2501 = 0.4 · lb	Total2501 = 0.5 · lb

SUMMARY

STF-SURFACE WATER MASS LOADINGS

INVESTIGATION PERIOD IS N DAYS. N = 352

BARIUM

SAMPLING PT 2500

month	total (month & storm)
Totalm2500 = 4 · kg	Total2500 = 5 · kg
Totalm2500 = 10 · lb	Total2500 = 11 · lb

SAMPLING PT 2501

month	total (month & storm)
Totalm2501 = 4 · kg	Total2501 = 5 · kg
Totalm2501 = 10 · lb	Total2501 = 11 · lb

SUMMARY

STF-SURFACE WATER MASS LOADINGS

INVESTIGATION PERIOD IS N DAYS. N = 352

BORON

SAMPLING PT 2500

month	total (month & storm)
Totalm2500 = 8·kg	Total2500 = 8·kg
Totalm2500 = 17·lb	Total2500 = 17·lb

SAMPLING PT 2501

month	total (month & storm)
Totalm2501 = 3·kg	Total2501 = 3·kg
Totalm2501 = 7·lb	Total2501 = 7·lb

SUMMARY

STF-SURFACE WATER MASS LOADINGS

INVESTIGATION PERIOD IS N DAYS. N = 352

CHROMIUM

SAMPLING PT 2500

month	total (month & storm)
Totalm2500 = 1·kg	Total2500 = 1·kg
Totalm2500 = 3·lb	Total2500 = 3·lb

SAMPLING PT 2501

month	total (month & storm)
Totalm2501 = 1·kg	Total2501 = 1·kg
Totalm2501 = 2·lb	Total2501 = 2·lb

SUMMARY

STF-SURFACE WATER MASS LOADINGS

INVESTIGATION PERIOD IS N DAYS. N = 352

COBALT

SAMPLING PT 2500

month	total (month & storm)
Totalm2500 = 73 · kg	Total2500 = 73 · kg
Totalm2500 = 162 · lb	Total2500 = 162 · lb

SAMPLING PT 2501

month	total (month & storm)
Totalm2501 = 0.4 · kg	Total2501 = 0.4 · kg
Totalm2501 = 0.9 · lb	Total2501 = 1 · lb

SUMMARY

STF-SURFACE WATER MASS LOADINGS

INVESTIGATION PERIOD IS N DAYS. N = 352

COPPER

SAMPLING PT 2500

month	total (month & storm)
Totalm2500 = 4·kg	Total2500 = 4·kg
Totalm2500 = 9·lb	Total2500 = 10·lb

SAMPLING PT 2501

month	total (month & storm)
Totalm2501 = 1·kg	Total2501 = 1·kg
Totalm2501 = 2·lb	Total2501 = 2·lb

SUMMARY

STF-SURFACE WATER MASS LOADINGS

INVESTIGATION PERIOD IS N DAYS. N = 352

IRON

SAMPLING PT 2500

month	total (month & storm)
Totalm2500 = 258 · kg	Total2500 = 319 · kg
Totalm2500 = 568 · lb	Total2500 = 704 · lb

SAMPLING PT 2501

month	total (month & storm)
Totalm2501 = 485 · kg	Total2501 = 548 · kg
Totalm2501 = 1069 · lb	Total2501 = 1208 · lb

SUMMARY

STF-SURFACE WATER MASS LOADINGS

INVESTIGATION PERIOD IS N DAYS. N = 352

LEAD

SAMPLING PT 2500

month	total (month & storm)
Totalm2500 = 4·kg	Total2500 = 5·kg
Totalm2500 = 8·lb	Total2500 = 11·lb

SAMPLING PT 2501

month	total (month & storm)
Totalm2501 = 1·kg	Total2501 = 1·kg
Totalm2501 = 2·lb	Total2501 = 2·lb

SUMMARY

STF-SURFACE WATER MASS LOADINGS

INVESTIGATION PERIOD IS N DAYS. N = 352

MAGNESIUM

SAMPLING PT 2500

month	total (month & storm)
Totalm2500 = 2619 · kg	Total2500 = 2619 · kg
Totalm2500 = 5774 · lb	Total2500 = 5775 · lb

SAMPLING PT 2501

month	total (month & storm)
Totalm2501 = 303 · kg	Total2501 = 320 · kg
Totalm2501 = 667 · lb	Total2501 = 705 · lb

SUMMARY

STF-SURFACE WATER MASS LOADINGS

INVESTIGATION PERIOD IS N DAYS. N = 352

MANGANESE

SAMPLING PT 2500

month	total (month & storm)
Totalm2500 = 12 · kg	Total2500 = 13 · kg
Totalm2500 = 27 · lb	Total2500 = 29 · lb

SAMPLING PT 2501

month	total (month & storm)
Totalm2501 = 15 · kg	Total2501 = 17 · kg
Totalm2501 = 34 · lb	Total2501 = 36 · lb

SUMMARY

STF-SURFACE WATER MASS LOADINGS

INVESTIGATION PERIOD IS N DAYS. N = 352

MERCURY

SAMPLING PT 2500

month	total (month & storm)
Totalm2500 = 0 ·kg	Total2500 = 0 ·kg
Totalm2500 = 0 ·lb	Total2500 = 0 ·lb

SAMPLING PT 2501

month	total (month & storm)
Totalm2501 = 0.01 ·kg	Total2501 = 0 ·kg
Totalm2501 = 0 ·lb	Total2501 = 0 ·lb

SUMMARY

STF-SURFACE WATER MASS LOADINGS

INVESTIGATION PERIOD IS N DAYS. N = 352

NICKEL

SAMPLING PT 2500

month	total (month & storm)
Totalm2500 = 2·kg	Total2500 = 2·kg
Totalm2500 = 5·1b	Total2500 = 5·1b

SAMPLING PT 2501

month	total (month & storm)
Totalm2501 = 1·kg	Total2501 = 1·kg
Totalm2501 = 3·1b	Total2501 = 3·1b

SUMMARY

STF-SURFACE WATER MASS LOADINGS

INVESTIGATION PERIOD IS N DAYS. N = 352

POTASSIUM

SAMPLING PT 2500

month	total (month & storm)
Totalm2500 = 1941 · kg	Total2500 = 1941 · kg
Totalm2500 = 4279 · lb	Total2500 = 4279 · lb

SAMPLING PT 2501

month	total (month & storm)
Totalm2501 = 166 · kg	Total2501 = 179 · kg
Totalm2501 = 367 · lb	Total2501 = 395 · lb

SUMMARY

STF-SURFACE WATER MASS LOADINGS

INVESTIGATION PERIOD IS N DAYS. N = 352

SODIUM

SAMPLING PT 2500

month	total (month & storm)
Totalm2500 = 23476 · kg	Total2500 = 24071 · kg
Totalm2500 = 51756 · lb	Total2500 = 53067 · lb

SAMPLING PT 2501

month	total (month & storm)
Totalm2501 = 504 · kg	Total2501 = 514 · kg
Totalm2501 = 1112 · lb	Total2501 = 1134 · lb

SUMMARY

STF-SURFACE WATER MASS LOADINGS

INVESTIGATION PERIOD IS N DAYS. N = 352

VANADIUM

SAMPLING PT 2500

month	total (month & storm)
Totalm2500 = 1·kg	Total2500 = 1·kg
Totalm2500 = 3·lb	Total2500 = 3·lb

SAMPLING PT 2501

month	total (month & storm)
Totalm2501 = 1·kg	Total2501 = 1·kg
Totalm2501 = 2·lb	Total2501 = 2·lb

SUMMARY

STF-SURFACE WATER MASS LOADINGS

INVESTIGATION PERIOD IS N DAYS. N = 352

ZINC

SAMPLING PT 2500

month	total (month & storm)
Totalm2500 = 31 · kg	Total2500 = 35 · kg
Totalm2500 = 68 · lb	Total2500 = 78 · lb

SAMPLING PT 2501

month	total (month & storm)
Totalm2501 = 4 · kg	Total2501 = 5 · kg
Totalm2501 = 9 · lb	Total2501 = 10 · lb

APPENDIX SW-D

SUMMARY TABLES FOR INORGANIC AND ORGANIC ANALYTES DETECTED DURING ONSITE SEASONAL SAMPLING EVENTS

TABLE SW-D1

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2501

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics			(ug/L)	(mg/kg)	(ug/L)	(mg/kg)
Aluminum			11,300	12,200	2,550 J4	10,500
Arsenic			ND	5.7	ND	3
Barium			B 68.5 J4	B 45.7	B 27.9	B 29.9
Boron			B 30.4	ND	ND	ND
Calcium			15,500	6,850	10,500	4,330
Chromium III			ND	26.4	0	23.1
Chromium (Total)			18	26.4 J4	ND	23.1
Cobalt			ND	B 8	ND	B 7.6
Copper			44.8	20.6	B 14.8	18.7 J4
Iron			8,370	19,200	2,370	13,800
Lead			107	56.6 J4	41.7 J4	75.2
Magnesium			B 4,990	4,940	B 4,470	4,240
Manganese			177	281 J4	104	218
Mercury			ND	ND	ND	0.47
Nickel			ND	29.7	ND	23.7
Potassium			B 2,860	B 813	B 2,510	B 446
Sodium			27,900	ND	12,200	B 237
Vanadium			B 18.3	37.9	B 9.2	32.7
Zinc			179	121 J4	140	69.6
PAHs			(ug/L)	(mg/kg)	(ug/L)	(mg/kg)
Phenanthrene			0.26	0.062	0.47	0.06 J4
Fluoranthene			0.65	ND	1.8	0.19
Pyrene			0.78	0.11	1.1	0.19 J4
Benzo(a)anthracene			0.16	0.035	0.32	0.09
Chrysene			0.35	0.057	0.52	0.09
Benzo(b)fluoranthene			0.29	0.051	0.41	0.09
Benzo(k)fluoranthene			0.13	0.025	0.26	0.06 J4
Benzo(a)pyrene			0.21	ND	0.29	0.11
Indeno(1,2,3-cd)pyrene			ND	ND	0.32	0.02
Benzo(g,h,i)perylene			ND	ND	0.37	0.05
Volatiles			(ug/L)	(ug/kg)	(ug/L)	(ug/kg)
Methylene Chloride			ND	B 85 J4	ND	ND
Toluene			ND	26	ND	ND
Semivolatiles			(ug/L)	(ug/kg)	(ug/L)	(ug/kg)
4-Methylphenol			ND	ND	ND	J 110
Diethylphthalate			ND	ND	J 0.6	ND
bis(2-Ethylhexyl)-phthalate			J 5	J 1,000 J4	J 5	J 560
Bacteria			MPN/100mL[d]	NA[e]	MPN/100mL	NA
Fecal Coliform			60,000	--	16,000	--
Fecal Streptococcus			2,100	--	37,000	--

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample.
(c) Location 2501 not sampled during transitional season.
(d) MPN = Most probable number.
(e) NA = Not applicable.
ND Not detected.

TABLE SW-D2

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2502

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics			(ug/L)	(mg/kg)	(ug/L)	(mg/kg)
Aluminum			809	17,700	2,000 J4	21,100
Antimony			ND	ND	ND	B 8 J4
Arsenic			ND	23.1	B 5.5	24.6
Barium			B 18.7 J4	B 106	B 18.7	119
Boron			28.8	ND	ND	47.6
Cadmium				18	ND	5.6
Calcium			13,300	5,930	B 4,960	6,840
Chromium III			ND	65.8	0	84.3
Chromium (Total)			ND	65.8 J4	10.1	84.3
Cobalt			ND	B 8.1	ND	B 11.6
Copper			B 15.9	224	B 19.5	349 J4
Iron			1,310	16,500	2,010	18,900
Lead			36.5	584	52.4 J4	666
Magnesium			B 4,500	4,690	B 1,570	5,460
Manganese			70.7	194 J4	41.5	203
Mercury			ND	1.3	ND	1
Nickel			ND	ND	ND	60.5
Potassium			B 3,480	B 1,140	B 2,750	B 1,210
Selenium			ND	ND	B 2.2	ND
Sodium			73,100	ND	33,100	B 863
Vanadium			ND	58.5	B 4.8	70
Zinc			71.1	1,080 J4	158	1,240
PAHs			(ug/L)	(mg/kg)	(ug/L)	(mg/kg)
Fluorene			0.45	1.4 J4	0.16	ND
Phenanthrene			3.9	13 J4	2.1	45 J4
Anthracene			ND	1.2 J4	0.14	3.3 J4
Fluoranthene			7.3	26 J4	7.7	110 J4
Pyrene			6.2	22 J4	5	85 J4
Benzo(a)anthracene			1.5	6.4 J4	0.84	27 J4
Chrysene			2.9	10 J4	1.3	42 J4
Benzo(b)fluoranthene			2.2	9.6 J4	2	36 J4
Benzo(k)fluoranthene			1.1	5.3 J4	1.2	22 J4
Benzo(a)pyrene			2	9 J4	2	32 J4
Indeno(1,2,3-cd)pyrene			2	7.1 J4	1.5	29 J4
Dibenzo(a,h)anthracene			ND	ND	1	5.1 J4
Benzo(g,h,i)perylene			2.3	7.8 J4	1.1	29 J4
Volatiles			(ug/L)	(ug/kg)	(ug/L)	(ug/kg)
Benzene			ND	J 24	ND	ND
Toluene			J 7	ND	ND	J 15
Ethylbenzene			ND	170 J4	ND	ND
Xylenes (Total)			ND	890 J4	ND	ND

TABLE SW-D2

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2502

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Semivolatiles			(ug/L)	(ug/kg)	(ug/L)	(ug/kg)
Dibenzofuran			ND	J 2,900	ND	ND
Pentachlorophenol			ND	ND	J 6	ND
Carbazole			ND	J 15,000	ND	ND
Butylbenzylphthalate			ND	J 3,600	ND	ND
bis(2-Ethylhexyl)-phthalate			10	160,000	J 5.0	120,000J4
Di-n-octylphthalate			ND	J 6,200	ND	J 4,300 J4
Pesticides/PCBs			(ug/L)	(ug/kg)	(ug/L)	(ug/kg)
Endrin			ND	160 J3	ND	ND
Endosulfan II			ND	160 J3	ND	ND
Endosulfan sulfate			ND	310 J3	ND	ND
4,4-DDT			ND	260 J	ND	ND
Endrin ketone			ND	210 J3	ND	ND
Bacteria			MPN/100mL[d]	NA[e]	MPN/100mL	NA
Fecal Coliform			12,000	--	13	--
Fecal Streptococcus			13,000	--	3,500	--

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample.
(c) Location 2502 not sampled during transitional season.
(d) MPN = Most probable number.
(e) NA = Not applicable.
ND Not detected.

TABLE SW-D3

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2503

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics			(ug/L)	(mg/kg)	(ug/L)	(mg/kg)
Aluminum			474	10,600	1,450 J4	11,800
Antimony			ND	ND	ND	B 8.5 J4
Arsenic			ND	12.7	ND	17.6
Barium			ND	B 76.7	B 18.7	93.1
Boron			B 32.8	ND	ND	ND
Cadmium			ND	B 2.4	ND	2.5 J4
Calcium			13,500	4,760	5,430	4,570
Chromium III			ND	48.9	0	62.4
Chromium (Total)			ND	48.9 J4	10.8	62.4
Cobalt			ND	B 5.9	ND	B 8.1
Copper			B 13.5	149	B 12	170 J4
Iron			693	12,000	1,720	12,500
Lead			38.9	450	33.5 J	581
Magnesium			5,150	3,100	B 1,430	3,390
Manganese			58.4	137 J4	38.6	137
Mercury			ND	0.69	ND	0.55
Nickel			ND	ND	ND	36.4
Potassium			B 2,280	B 831	B 2,980	B 756
Sodium			26,300	ND	34,900	B 571
Vanadium			ND	40.3	B 5.6	44.7
Zinc			57.4	606 J4	132	807
PAHs			(ug/L)	(mg/kg)	(ug/L)	(mg/kg)
Naphthalene			ND	0.41 J4	ND	ND
Acenaphthene			ND	1.5 J4	ND	ND
Fluorene			ND	2.6 J4	0.21	ND
Phenanthrene			2.4	22 J4	1.1	64 J4
Anthracene			ND	2.7 J4	0.052	5.6 J4
Fluoranthene			5	41 J4	4	130 J4
Pyrene			4.4	34 J4	2.3	99 J4
Benzo(a)anthracene			1.2	11 J4	0.97	32 J4
Chrysene			2	15 J4	1.2	44 J4
Benzo(b)fluoranthene			1.5	12 J4	0.7	35 J4
Benzo(k)fluoranthene			0.75	7.2 J4	0.37	22 J4
Benzo(a)pyrene			1.4	13 J4	0.91	35 J4
Indeno(1,2,3-cd)pyrene			1.6	9.6 J4	0.42	26 J4
Dibenzo(a,h)anthracene			ND	ND	ND	5.5 J4
Benzo(g,h,i)perylene			1.6	8.1 J4	ND	28 J4
Volatiles			(ug/L)	(ug/kg)	(ug/L)	(ug/kg)
Acetone			ND	1,000 J4	ND	ND
Chloroform			J 5	ND	J 2	ND
Toluene			ND	840	ND	120
Ethylbenzene			ND	35	ND	60
Xylenes (Total)			ND	153	ND	320

TABLE SW-D3

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2503

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Semivolatiles			(ug/L)	(ug/kg)	(ug/L)	(ug/kg)
4-Methylphenol			ND	ND	J 0.7	ND
Dibenzofuran			ND	J 2,900 J4		J 3,300
Pentachlorophenol			ND	ND	J 5	ND
Carbazole			ND	J 14,000 J4	ND	J 5,500
Butylbenzylphthalate			ND	J 3,500 J4	J 0.5	ND
bis(2-Ethylhexyl)-phthalate			ND	91,000 J4	J 7	91,000 J4
Di-n-octylphthalate			ND	J 2,800 J4	J 0.6 J4	J 4,600 J4
Pesticides/PCBs			(ug/L)	(ug/kg)	(ug/L)	(ug/kg)
4,4-DDT			ND	85 J	ND	ND
Bacteria			MPN/100mL[d]	NA[e]	MPN/100mL	NA
Fecal Coliform			17,000	--	22,000	--
Fecal Streptococcus			5,200	--	4,500	--

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample.
(c) Location 2503 not sampled during transitional season.
(d) MPN = Most probable number.
(e) NA = Not applicable.
ND Not detected.

TABLE SW-D4

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2504

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season[d] (August 1991)		Wet Season[d] (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics				(mg/kg)		(mg/kg)
Aluminum				33,000		26,900
Arsenic				11.7		9.7 J4
Barium				B 131		B 100
Cadmium				B 2.6		
Calcium				6,840		5,720
Chromium III				96.2		72.5
Chromium (Total)				96.2		72.5
Cobalt				B 10.7		B 11.9 J4
Copper				242		146
Iron				23,600		20,700
Lead				1,310		1,040
Magnesium				6,960		5,730
Manganese				282		283 J4
Mercury				1.2		0.88 J3
Nickel				61.2		48.3
Potassium				B 1,220		B 1,230
Sodium				B 774		B 478
Vanadium				65		50.4 J4
Zinc				553		395
PAHs				(mg/kg)		(mg/kg)
Phenanthrene				0.66		0.4
Anthracene				0.05		
Fluoranthene				1.3		1.1
Pyrene				1.3		0.84
Benzo(a)anthracene				0.3		0.24
Chrysene				0.77		0.46
Benzo(b)fluoranthene				1.3		0.65
Benzo(k)fluoranthene				0.53		0.37
Benzo(a)pyrene				0.87		0.50
Indeno(1,2,3-cd)pyrene				1.4		0.62
Dibenzo(a,h)anthracene				ND		0.13
Benzo(g,h,i)perylene				1.5		0.64
Volatiles				(ug/kg)		(ug/kg)
Acetone				ND		B 800
Semivolatiles				(ug/kg)		(ug/kg)
Di-n-butylphthalate				ND		J 83
Butylbenzylphthalate				ND		J 82
bis(2-Ethylhexyl)-phthalate				ND		J 970
Pesticides/PCBs				(ug/kg)		(ug/kg)
Endrin				60 J3		ND
Aroclor-1260				ND		790 J4

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample.
(c) Location 2504 not sampled during transitional season.
(d) No surface water sample collected at Location 2504 during dry and wet seasons (no surface water present).
ND Not detected.

TABLE SW-D5

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2505

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season[d] (August 1991)		Wet Season[d] (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics				(mg/kg)	(µg/L)	
Aluminum				29,800	681	
Arsenic				13.6	ND	
Barium				133	12.8	
Beryllium				B 0.64	ND	
Boron				ND	B 35.7	
Calcium				7,060	6,810	
Chromium III				76.2	0	
Chromium (Total)				76.2	ND	
Cobalt				B 11.2	ND	
Copper				179	ND	
Iron				20,000	688	
Lead				1,110 J4	14.9 J4	
Magnesium				5,610	B 2,730	
Manganese				245	ND	
Mercury				1 J4	ND	
Nickel				69.3	ND	
Potassium				B 992	B 1,940	
Sodium				B 962	15,600	
Vanadium				87.9	ND	
Zinc				549	54	
PAHs				(mg/kg)	(µg/L)	
Phenanthrene				0.34	ND	
Fluoranthene				0.81	ND	
Pyrene				0.87	ND	
Benzo(a)anthracene				0.28	ND	
Chrysene				0.69	ND	
Benzo(b)fluoranthene				1	ND	
Benzo(k)fluoranthene				0.42	ND	
Benzo(a)pyrene				0.65	ND	
Indeno(1,2,3-cd)pyrene				0.92	ND	
Benzo(g,h,i)perylene				0.90	ND	
Volatiles				(µg/kg)	(µg/L)	
Methylene Chloride				80 J4	J 8 J4	
Acetone				J 7	ND	
Semivolatiles				(µg/kg)	(µg/L)	
Carbazole				J 210 J4	ND	
Butylbenzylphthalate				J 190	ND	
bis(2-Ethylhexyl)-phthalate				J 1,600	ND	
Pesticides/PCBs				(µg/kg)	(µg/L)	
Aroclor-1254				910 J	ND	

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample.
(c) Location 2505 not sampled during transitional season.
(d) No surface water sample collected at Location 2505 during dry season (no surface water present). No sediment sample collected at Location 2505 during wet season (surface debris prohibited sample collection).
ND Not detected.

TABLE SW-6

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2506

Analyte	Concentration[a,b]					
	Transitional Season (March/April 1991)		Dry Season[c] (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics	(ug/L)	(mg/kg)		(mg/kg)	(ug/L)	(mg/kg)
Aluminum	ND	30,100		26,350	591.5	37,600
Arsenic	B 3.7 J4	93.8 J4		19	B 1.1	9 J4
Barium	B 13.5	134		124.5	11.2	186
Beryllium	ND	ND		B 0.65	ND	ND
Boron	ND	ND		ND	B 29	ND
Cadmium	ND	6.7		4.8	ND	10.8 J4
Calcium	7,695	5,960 J4		6,605	6,220	8,500
Chromium III	ND	ND		69.6	0	0
Chromium (Total)	ND	73.2 J4		69.6	ND	76.1
Cobalt	ND	B 10.7		B 10.6	B 5.5	B 15.5 J4
Copper	ND	230		223	ND	273
Cyanide	ND	0.8		ND	ND	ND
Iron	331 J4	19,200		16,500	606.5	24,500
Lead	ND	170		1,100	13.4 J4	1,130
Magnesium	B 2,570 J4	4,910		5,045	B 2,450	7,660
Manganese	31.25	209 J4		201	ND	305 J4
Mercury	ND	0.9		0.94 J4	ND	0.81 J3
Nickel	ND	61.6		68.2	B 16.8	65.1
Potassium	B 3,010	B 1,210		B 1,025.5	B 2,045	B 2,080
Selenium	B 3.1	B 1		3.3 J4	ND	ND
Sodium	33,200	B 1,780		B 730.5	14,450	B 716
Vanadium	ND	74.2		82	ND	86
Zinc	ND	842 J4		812	81.1	1,450
PAHs	(ug/L)	(mg/kg)		(mg/kg)	(ug/L)	(mg/kg)
Phenanthrene	ND	0.08		0.22	ND	0.05 J4
Anthracene	0.01	ND		ND	ND	ND
Fluoranthene	ND	0.21		0.76	ND	0.15
Pyrene	ND	0.17		0.69	ND	0.16 J4
Benzo(a)anthracene	ND	0.06		0.24	ND	0.05
Chrysene	ND	0.15		0.63	ND	0.10
Benzo(b)fluoranthene	ND	0.19		0.77	ND	0.15
Benzo(k)fluoranthene	ND	0.08		0.25	ND	0.08
Benzo(a)pyrene	ND	0.11 J4		0.39	ND	0.08
Indeno(1,2,3-cd)pyrene	ND	0.16		0.6	ND	0.1
Benzo(g,h,i)perylene	ND	0.11		0.47	ND	0.1
Volatiles	(ug/L)	(ug/kg)		(ug/kg)	(ug/L)	(ug/kg)
Methylene Chloride	B 2.5 UJ	ND		B 1,050 J4	ND	JB 25 UJ
Acetone	ND	ND		J 8	ND	B 89 UJ
Chloroform	ND	140		ND	ND	ND
Toluene	ND	2,300		ND	ND	ND
Semivolatiles	(ug/L)	(ug/kg)		(ug/kg)	(ug/L)	(ug/kg)
4-Methylphenol	ND	5,000		ND	ND	J 1,300
bis(2-Ethylhexyl)-phthalate	ND	ND		J 2,000	ND	J 1,000
Di-n-octylphthalate	ND	ND		J 830	J 0.7	ND

TABLE SW-6

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2506

Analyte	Concentration[a,b]					
	Transitional Season (March/April 1991)		Dry Season[c] (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Pesticides/PCBs	(µg/L)	(µg/kg)		(µg/kg)	(µg/L)	(µg/kg)
Aroclor-1254	ND	ND		410 J	ND	ND
Aroclor-1260	ND	ND		2,700 J	ND	ND
Bacteria	MPN/100mL[d]	NA[e]			MPN/100mL	NA
Fecal Coliform	3	--			3.0	--
Fecal Streptococcus	4	--			2.0	--

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample.
(c) No surface water sample collected at Location 2506 during dry season (no surface water present).
(d) MPN = Most probable number.
(e) NA = Not applicable.
ND Not detected.

TABLE SW-D7

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2507

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season[d] (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics				(mg/kg)	(ug/L)	(mg/kg)
Aluminum				26,100	515	13,700
Arsenic				12.5	B 1.2	3.3 J4
Barium				117	B 10.4	50
Beryllium				B 0.58	ND	ND
Boron				ND	B 31.1	ND
Cadmium				3.7	ND	ND
Calcium				7,840	5,900	3,580
Chromium III				56.8	0	24.5
Chromium (Total)				56.8	B 7.8	24.5
Cobalt				B 9.9	B 7.7	B 8.6 J4
Copper				226	ND	ND
Iron				17,500	517	16,200
Lead				594	12.2 J4	104
Magnesium				5,190	B 2,280	5,370
Manganese				269	ND	206 J4
Mercury				0.77 J4	ND	0.28 J3
Nickel				56.9	ND	23.5
Potassium				B 880	B 2,980	B 617
Sodium				B 544	13,400	B 196
Vanadium				47.4	B 9.1	39.9
Zinc				603	54	114
PAHs				(mg/kg)	(ug/L)	(mg/kg)
Phenanthrene				0.4	ND	0.31 J
Anthracene				0.02	ND	ND
Fluoranthene				0.84	ND	1.2 J3
Pyrene				0.79	ND	1.2 J
Benzo(a)anthracene				0.21	ND	0.39 J3
Chrysene				0.58	ND	0.46 J3
Benzo(b)fluoranthene				1.2	ND	0.76 J3
Benzo(k)fluoranthene				0.45	ND	0.44 J3
Benzo(a)pyrene				0.57	ND	0.47 J3
Indeno(1,2,3-cd)pyrene				1.1	ND	0.57 J3
Benzo(g,h,i)perylene				1	ND	0.66 J3
Volatiles				(ug/kg)	(ug/L)	(ug/kg)
Methylene Chloride				B 950 J4	ND	ND
Toluene				J 6 J4	ND	ND
Semivolatiles				(ug/kg)	(ug/L)	(ug/kg)
4-Methylphenol				ND	ND	J 720
Carbazole				J 270 J4	ND	ND
bis(2-Ethylhexyl)-phthalate				J 2,900	ND	J 2,600

TABLE SW-D7

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2507

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season[d] (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Bacteria					MPN/100mL[e]	NA[f]
Fecal Coliform					8	--
Fecal Streptococcus					2	--

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample.
(c) Location 2507 not sampled during transitional season.
(d) No surface water sample collected at Location 2507 during dry season (no surface water present).
(e) MPN = Most probable number.
(f) NA = Not applicable.

TABLE SW-D8

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2508

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics			(ug/L)	(mg/kg)	(ug/L)	(mg/kg)
Aluminum			ND	8,010	663	9,380
Arsenic			10.4	12.7	ND	3.2 J4
Barium			B 35.2	B 87.4	B 13.9	73.1
Boron			ND	ND	B 28.2	ND
Calcium			19,400	7,370	8,520	3,770
Chromium III			ND	16.4	0	16.8
Chromium (Total)			ND	ND	ND	16.8
Cobalt			ND	ND	ND	B 5.1 J4
Copper			13.1 J4	88.8	B 11.2 J4	ND
Iron			2,370	10,100	773	9,330
Lead			17.2 J4	397 J4	15.8 J4	163
Magnesium			B 2,000	B 1,110	B 2,700	2,580
Manganese			225	140	21.3	120 J4
Nickel			ND	ND	ND	17.4 J4
Potassium			B 2,860	ND	B 2,160	B 525
Sodium			B 23,300	ND	15,500	B 298
Vanadium			ND	B 32.5	ND	23.1 J4
Zinc			54.9	206	52.6	111
PAHs			(ug/L)	(mg/kg)	(ug/L)	(mg/kg)
Phenanthrene			ND	0.11	ND	0.15 J4
Fluoranthene			ND	0.22	ND	ND
Pyrene			ND	0.18	ND	0.31 J4
Benzo(a)anthracene			ND	0.10	ND	0.16
Chrysene			ND	0.14	ND	0.13
Benzo(b)fluoranthene			ND	0.16	ND	0.11
Benzo(k)fluoranthene			ND	ND	ND	0.08
Benzo(a)pyrene			ND	ND	ND	0.10
Dibenzo(a,h)anthracene			ND	0.25	ND	ND
Volatiles			(ug/L)	(ug/kg)	(ug/L)	(ug/kg)
Chloromethane			ND	ND	ND	J 18
Acetone			ND	ND	ND	340 J4
Toluene			ND	ND	ND	96 J4
Semivolatiles			(ug/L)	(ug/kg)	(ug/L)	(ug/kg)
4-Methylphenol			ND	ND	ND	J 2,500
Butylbenzylphthalate			ND	ND	ND	J 190
bis(2-Ethylhexyl)-phthalate			ND	J 210	J 0.7	J 1,600
Di-n-octylphthalate			ND	ND	ND	J 100 J4
Bacteria			MPN/100mL[d]	NA[e]	MPN/100mL	NA
Fecal Coliform			3,900	--	16	--
Fecal Streptococcus			390	--	16	--

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample.
(c) Location 2508 not sampled during transitional season.
(d) MPN = Most probable number.
(e) NA = Not applicable.
ND Not detected.

TABLE SW-D9

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2509

Analyte	Concentration[a,b]					
	Transitional Season (March/April 1991)		Dry Season[c] (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics	(ug/L)	(mg/kg)		(mg/kg)	(ug/L)	(mg/kg)
Aluminum	2,510	17,700		13,095	470	10,240
Arsenic	B 3.9	59.9 J4		9.7	B 1.2	8.3 J4
Barium	B 24.7	150		161	B 13	105
Beryllium	ND	ND		B 0.37	ND	ND
Boron	ND	ND		ND	B 36.5	ND
Cadmium	ND	ND		ND	ND	B 0.98 J4
Calcium	9,375	18,300 J4		13,755	8,780	10,050
Chromium III	ND	ND		45.6	0	39.4
Chromium VI	ND	ND		ND	ND	1.0
Chromium (Total)	ND	71.2 J4		45.6	B 5.8	40.4
Cobalt	ND	10.8		B 7.1	B 5.7	B 8.6
Copper	ND	62.1		46.4	B 6.5 J4	50.3
Cyanide	ND	0.7		ND	10.4 J3	ND
Iron	1,127 J4	5,330		21,050	659	18,500
Lead	8.3	54.7		53 J4	12.3	59.4
Magnesium	B 2,535	3,750		3,470	2,705	2,825
Manganese	40.85	473 J4		555.5	ND	307 J4
Mercury	B 0.1	0.16		0.24 J4	ND	0.17 J3
Nickel	B 7.2	61.8		49.5	ND	42.9
Potassium	B 2,920	B 705		B 426.5	B 2,410	721.5
Selenium	ND	ND		B 0.77 J4	ND	B 0.49
Sodium	47,750	B 352		B 313.5	15,850	B 244
Vanadium	ND	64.6		40.1	ND	41.6
Zinc	ND	174 J4		125.4	46	123.3
PAHs	(ug/L)	(mg/kg)		(mg/kg)	(ug/L)	(mg/kg)
Naphthalene	ND	ND		0.31	ND	ND
Phenanthrene	ND	0.15		0.22	ND	0.16 J4
Anthracene	ND	ND		0.03	ND	0.02
Fluoranthene	ND	0.19		ND	ND	0.37
Pyrene	ND	0.27		0.91	ND	0.37 J4
Benzo(a)anthracene	ND	ND		0.3	ND	0.15
Chrysene	ND	0.13		0.42	ND	0.19
Benzo(b)fluoranthene	ND	0.18		0.36	ND	0.17
Benzo(k)fluoranthene	ND	0.072		0.14	ND	0.11
Benzo(a)pyrene	ND	0.13 J4		0.37	ND	0.18
Indeno(1,2,3-cd)pyrene	ND	0.11		0.33	ND	0.08
Benzo(g,h,i)perylene	ND	0.13		0.30	ND	0.08
Volatiles	(ug/L)	(ug/kg)		(ug/kg)	(ug/L)	(ug/kg)
Methylene Chloride	ND	ND		B 415 J4	ND	ND
Acetone	ND	ND		ND	ND	77 J4

TABLE SW-D9

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2509

Analyte	Concentration[a,b]					
	Transitional Season (March/April 1991)		Dry Season[c] (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Semivolatiles	(µg/L)	(µg/kg)		(µg/kg)	(µg/L)	(µg/kg)
Phenol	ND	ND		J 775	ND	J 1,160
2-Methylphenol	ND	J 80		ND	ND	ND
2-Methylnaphthalene	ND	ND		J 310	ND	J 410
Carbazole	ND	ND		ND	ND	J 110
Di-n-butylphthalate	ND	ND		ND	ND	J 96
Butylbenzylphthalate	ND	ND		ND	ND	48,000
bis(2-Ethylhexyl)-phthalate	ND	ND		J 275	ND	J 2,330
Bacteria	MPN/100mL[d]	NA[e]			MPN/100mL	NA
Fecal Coliform	ND	--			20	--
Fecal Streptococcus	1.0	--			31	--

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample.
(c) No surface water samples collected at Location 2509 during dry season (no surface water present).
(d) MPN = Most probable number.
(e) NA = Not applicable.
ND Not detected.

TABLE SW-D10

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2510

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics			(µg/L)	(mg/kg)	(µg/L)	(mg/kg)
Aluminum			330 J4	10,800	494	17,800
Arsenic			B 2.8	10	B 1.3	8.8 J4
Barium			B 19.9	84.3	B 13.1	118
Boron			ND	ND	B 31	ND
Calcium			11,400	4,070	8,680	16,700
Chromium III			ND	25	ND	34.5
Chromium (Total)			ND	ND	ND	34.5
Cobalt			ND	B 5.2	ND	B 10 J4
Copper			11.2 J4	57.9	ND	70
Iron			427	13,900	685	20,700
Lead			7.6 J4	98.2 J4	12.1 J4	103
Magnesium			B 1,290	3,250	B 2,700	3,640
Manganese			46.4	608	ND	310 J4
Mercury			ND	ND	ND	0.36 J3
Nickel			ND	39.5	B 9.7	41.9
Potassium			B 2,750	ND	B 2,280	B 803
Selenium			ND	ND	ND	1.9 J4
Sodium			19,200	B 220	15,800	B 363
Vanadium			B 7.4	28.4	ND	43
Zinc			58.8	297	47.2	279
PAHs			(µg/L)	(mg/kg)	(µg/L)	(mg/kg)
Fluorene			ND	ND	ND	0.07
Phenanthrene			ND	ND	ND	0.22 J4
Fluoranthene			ND	ND	ND	0.64
Pyrene			ND	ND	ND	0.37 J4
Chrysene			ND	ND	ND	0.17
Benzo(b)fluoranthene			ND	ND	ND	0.26
Benzo(k)fluoranthene			ND	ND	ND	0.14
Benzo(a)pyrene			ND	ND	ND	0.17
Indeno(1,2,3-cd)pyrene			ND	ND	ND	0.11
Benzo(g,h,i)perylene			ND	ND	ND	0.13
Volatiles			(µg/L)	(µg/kg)	(µg/L)	(µg/kg)
Methylene Chloride			ND	ND	J 8 J4	ND
Semivolatiles			(µg/L)	(µg/kg)	(µg/L)	(µg/kg)
bis(2-Ethylhexyl)-phthalate			ND	J 260	ND	J 2,600
Di-n-octylphthalate			ND	ND	ND	J 160
Bacteria			MPN/100mL[d]	NA[e]	MPN/100mL	NA
Fecal Coliform			2,800	--	26	--
Fecal Streptococcus			180	--	42	--

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample. A "U" qualifier indicates the analyte was not detected at the concentration indicated.
(c) Location 2510 not sampled during transitional season.
(d) MPN = Most probable number.
(e) NA = Not applicable.
ND Not detected.

TABLE SW-D11

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2511

Analyte	Concentration[a,b]					
	Transitional Season (March/April 1991)		Dry Season[c] (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics	(ug/L)	(mg/kg)		(mg/kg)	(ug/L)	(mg/kg)
Aluminum	ND	14,900		24,000	388.5	15,100
Arsenic	B 3.3	64.4 J4		14.1	B 1.3	6.8
Barium	B 11.1	153		287	B 14.2	117.5
Beryllium	ND	ND		B 0.62	ND	ND
Boron	ND	ND		ND	27.5	ND
Cadmium	ND	1.7		ND	ND	ND
Calcium	6,495	6,000 J4		6,505	9,575	4,920
Chromium III	ND	ND		75.1	0	0
Chromium (Total)	ND	66.4 J4		75.1	ND	48
Cobalt	ND	B 9.3		B 10.3	ND	B 9.1 J4
Copper	ND	88.3		138	ND	57.9
Cyanide	ND	0.9		ND	ND	1.3
Iron	318 J4	25,000		30,050	741.5	18,500
Lead	ND	82.3		257.5	10.5 J4	118.9 J4
Magnesium	B 1,740	4,500		4,925	B 2,705	4,040
Manganese	19.7	319 J4		430.5	ND	433 J4
Mercury	ND	ND		0.21 J4	ND	0.18 J3
Nickel	ND	50.4		68.2	B 9.8	44
Potassium	B 1,700	B 764		B 744	B 1,910	B 726
Selenium	ND	B 0.61		ND	ND	B 0.96
Sodium	16,000	B 340		B 411.5	16,150	B 254
Vanadium	ND	44.6		63.9	ND	36.7
Zinc	ND	399 J4		515.5	46	208.3
PAHs	(ug/L)	(mg/kg)		(mg/kg)	(ug/L)	(mg/kg)
Fluorene	ND	ND		0.03	ND	ND
Phenanthrene	ND	0.04		0.3	0.07	0.06
Anthracene	ND	ND		0.05	ND	0.02
Fluoranthene	ND	0.08		0.46	ND	0.23
Pyrene	ND	0.09		0.69	ND	0.18
Benzo(a)anthracene	ND	0.03		0.23	ND	0.11
Chrysene	ND	0.07		0.41	ND	0.11
Benzo(b)fluoranthene	ND	0.09		0.47	ND	0.14
Benzo(k)fluoranthene	ND	0.05		0.19	ND	0.08
Benzo(a)pyrene	ND	0.09 J4		0.43	ND	0.15
Indeno(1,2,3-cd)pyrene	ND	0.08		0.5	ND	0.11
Benzo(g,h,i)perylene	ND	0.08		0.36	ND	0.11
Volatiles	(ug/L)	(ug/kg)		(ug/kg)	(ug/L)	(ug/kg)
Methylene Chloride	B 3 UJ	ND		1,400 J4	ND	B 355
Acetone	ND	ND		77	ND	165 J4
Semivolatiles	(ug/L)	(ug/kg)		(ug/kg)	(ug/L)	(ug/kg)
Phenol	ND	J 260		J 430	ND	ND
2-Methylnaphthalene	ND	ND		J 108.5	ND	J 37
Dibenzofuran	ND	ND		J 31	ND	ND
Carbazole	ND	ND		J 57 J4	ND	ND
Butylbenzylphthalate	ND	1,400 J4		J 54	ND	J 300
bis(2-Ethylhexyl)-phthalate	ND	ND		J 340	ND	J 255

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2511

Analyte	Concentration[a,b]					
	Transitional Season (March/April 1991)		Dry Season[c] (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Pesticides/PCBs	(ug/L)	(ug/kg)		(ug/kg)	(ug/L)	(ug/kg)
Aroclor-1260	ND	ND		ND	ND	330 J4
Bacteria	MPN/100mL[d]	NA[e]			MPN/100mL	NA
Fecal Coliform	2.0	--			84	--
Fecal Streptococcus	1.5	--			458	--

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample. A "U" qualifier indicates the analyte was not detected at the concentration indicated.
(c) No surface water sample collected at Location 2511 during dry season (no surface water present).
(d) MPN = Most probable number.
(e) NA = Not applicable.
ND Not detected.

TABLE SW-D12

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2512

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season[d] (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics				(mg/kg)	(µg/L)	(mg/kg)
Aluminum				23,600	427	7,990
Arsenic				83.1	B 1.6	8 J4
Barium				141	B 16.3	B 48.7
Beryllium				B 0.62	ND	ND
Boron				ND	B 40.9	ND
Cadmium				ND	ND	B 1.2 J4
Calcium				5,360	10,300	3,580
Chromium III				48.6	0	16.9
Chromium (Total)				48.6	ND	16.9
Cobalt				B 3.9	ND	B 4.7 J4
Copper				80.6	B 6.9 J4	ND
Iron				12,500	929	5,620
Lead				160	18.1	63.6 J4
Magnesium				B 1,620	B 2,700	B 1,120
Manganese				201	40.3	95.2 J4
Mercury				0.3 J4	ND	ND
Nickel				37.7	ND	15.7 J4
Potassium				ND	B 1,800	B 373
Selenium				B 1.4 J4	ND	1.7
Sodium				B 345	16,900	B 219
Vanadium				81	ND	50.7
Zinc				346	56.6	86.8
PAHs				(mg/kg)	(µg/L)	(mg/kg)
Phenanthrene				0.2	ND	0.19
Anthracene				ND	ND	0.03
Fluoranthene				0.34	ND	0.3
Pyrene				0.44	ND	0.34
Benzo(a)anthracene				0.22	ND	0.28
Chrysene				0.3	ND	0.32
Benzo(b)fluoranthene				0.38	ND	0.43
Benzo(k)fluoranthene				0.19	ND	0.27
Benzo(a)pyrene				0.45	ND	0.59
Indeno(1,2,3-cd)pyrene				0.42	ND	0.5
Dibenzo(a,h)anthracene				ND	ND	0.09
Benzo(g,h,i)perylene				0.4	ND	0.54
Volatiles				(µg/kg)	(µg/L)	(µg/kg)
Methylene Chloride				760 J4	ND	ND
Acetone				66	ND	40
Semivolatiles				(µg/kg)	(µg/L)	(µg/kg)
4-Methylphenol				ND	ND	J 53
Carbazole				J 52 J4	ND	ND
Butylbenzylphthalate				J 120	ND	J 100
bis(2-Ethylhexyl)-phthalate				J 500	ND	J 150

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2512

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season[d] (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Bacteria					MPN/100ml[e]	NA[f]
Fecal Coliform					30,000	--
Fecal Streptococcus					240	--

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample. A "U" qualifier indicates the analyte was not detected at the concentration indicated.
(c) Location 2512 not sampled during transitional season.
(d) No surface water sample collected at Location 2512 during dry season (no surface water present).
(e) MPN = Most probable number.
(f) NA = Not applicable.
ND Not detected.

TABLE SW-D13

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2513

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season[d] (August 1991)		Wet Season[d] (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics				(mg/kg)		(mg/kg)
Aluminum				12,500		14,100
Antimony				B 6.5 J4		ND
Arsenic				B 3.7 J4		3.9 J4
Barium				51.7		54.5
Beryllium				B 0.3		ND
Boron				ND		ND
Calcium				2,290		3,050
Chromium III				27.5		29.4
Chromium (Total)				27.5		29.4
Cobalt				B 6.8		B 8 J4
Copper				33.3		ND
Iron				11,800		12,100
Lead				68.6 J4		75.9
Magnesium				3,810		3,890
Manganese				340		342 J4
Nickel				31.4		29.3
Potassium				B 324		B 496
Sodium				ND		B 135
Vanadium				35.3		38.2
Zinc				ND		123
PAHs				(mg/kg)		(mg/kg)
Phenanthrene				0.12		0.15
Anthracene				ND		0.02
Fluoranthene				0.32		0.48
Pyrene				0.47		0.42
Benzo(a)anthracene				0.34		0.27
Chrysene				0.46		0.35
Benzo(b)fluoranthene				0.62		0.46
Benzo(k)fluoranthene				0.35		0.28
Benzo(a)pyrene				0.65		0.58
Indeno(1,2,3-cd)pyrene				0.76		0.48
Dibenzo(a,h)anthracene				ND		0.15
Benzo(g,h,i)perylene				0.74		0.51
Volatiles				(ug/kg)		(ug/kg)
Methylene Chloride				130 J4		ND
Acetone				42		B 360
Toluene				ND		40
Semivolatiles				(ug/kg)		(ug/kg)
Di-n-butylphthalate				ND		J 29
Butylbenzylphthalate				ND		J 79
bis(2-Ethylhexyl)-phthalate				J 380		J 280
Pesticides/PCBs				(ug/kg)		(ug/kg)
Aroclor-1260				ND		J 130 J4

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample. A "U" qualifier indicates the analyte was not detected at the concentration indicated.
(c) Location 2513 not sampled during transitional season.
(d) No surface water sample collected at Location 2513 during dry and wet seasons (no surface water present).
ND Not dectected.

TABLE SW-D14

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2514

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season[d] (August 1991)		Wet Season[d] (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics				(mg/kg)		(mg/kg)
Aluminum				16,400		15,400
Arsenic				11.5		11.8 J4
Barium				88.9		74.1
Beryllium				B 0.38		ND
Cadmium				ND		1.4 J4
Calcium				3,760		3,910
Chromium III				48		41
Chromium (Total)				48		41
Cobalt				B 7.3		B 7.8 J4
Copper				65.5		59.5
Iron				12,100		10,600
Lead				491		365
Magnesium				3,330		2,740
Manganese				419		403 J4
Mercury				0.24 J4		0.15 J3
Nickel				ND		28.2
Potassium				B 388		B 492
Selenium				ND		B 0.73 J4
Sodium				B 156		B 171
Vanadium				38.3		35.7
Zinc				258		233
PAHs				(mg/kg)		(mg/kg)
Phenanthrene				0.22		ND
Anthracene				0.01		0.03
Fluoranthene				0.46		0.59
Pyrene				0.61		0.54
Benzo(a)anthracene				0.33		0.35
Chrysene				0.45		0.43
Benzo(b)fluoranthene				0.59		0.55
Benzo(k)fluoranthene				0.31		0.35
Benzo(a)pyrene				0.73		0.7
Indeno(1,2,3-cd)pyrene				0.72		0.58
Dibenzo(a,h)anthracene				ND		0.13
Benzo(g,h,i)perylene				0.74		0.61
Volatiles				(ug/kg)		(ug/kg)
Acetone				ND		B 580
Toluene				ND		110
Semivolatiles				(ug/kg)		(ug/kg)
2-Methylnaphthalene				ND		J 26
Dimethylphthalate				J 190		J 88
Di-n-butylphthalate				J 130		J 72
Butylbenzylphthalate				J 1,100		J 450
bis(2-Ethylhexyl)-phthalate				J 610		J 300

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2514

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season[d] (August 1991)		Wet Season[d] (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Pesticides/PCBs				(ug/kg)		(ug/kg)
Aroclor-1254				ND		J 190 JN

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample. A "U" qualifier indicates the analyte was not detected at the concentration indicated.
(c) Location 2514 not sampled during transitional season.
(d) No surface water sample collected at Location 2514 during dry and wet seasons (no surface water present).
ND Not dectected.

TABLE SW-D15

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2515

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season[d] (August 1991)		Wet Season[d] (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics				(mg/kg)		(mg/kg)
Aluminum				13,700		12,300
Antimony				B 8.2 J4		ND
Arsenic				13.3		9.8 J4
Barium				79.7		61.7
Beryllium				B 0.28		ND
Calcium				3,580		3,410
Chromium III				36.5		25.4
Chromium (Total)				36.5		25.4
Cobalt				B 6.8		B 6.5 J4
Copper				110		65.4
Iron				12,500		9,800
Lead				531		298
Magnesium				3,050		2,420
Manganese				480		360 J4
Mercury				0.52 J4		0.32 J3
Nickel				ND		20.6
Potassium				B 385		B 449
Selenium				ND		B 0.54
Sodium				B 170		B 156
Thallium				ND		ND
Vanadium				35.2		29.8
Zinc				243		169
PAHs				(mg/kg)		(mg/kg)
Phenanthrene				0.31		0.19
Anthracene				0.03		0.02
Fluoranthene				ND		0.4
Pyrene				0.63		0.32
Benzo(a)anthracene				0.2		0.13
Chrysene				0.3		0.17
Benzo(b)fluoranthene				0.33		0.16
Benzo(k)fluoranthene				0.15		0.1
Benzo(a)pyrene				0.31		0.18
Indeno(1,2,3-cd)pyrene				0.4		0.15
Dibenzo(a,h)anthracene				ND		0.03
Benzo(g,h,i)perylene				0.39		0.15
Volatiles				(µg/kg)		(µg/kg)
Acetone				41		B 400
Toluene				ND		J 5
Semivolatiles				(µg/kg)		(µg/kg)
Dimethylphthalate				J 1,800		J 910 J4
Di-n-butylphthalate				ND		J 130 J4
Butylbenzylphthalate				J 820		J 600 J4
bis(2-Ethylhexyl)-phthalate				J 730	ND	J 510 J4

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample. A "U" qualifier indicates the analyte was not detected at the concentration indicated.
(c) Location 2515 not sampled during transitional season.
(d) No surface water sample collected at Location 2515 during dry and wet seasons (no surface water present).
ND Not detected.

TABLE SW-D16

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2516

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season[d] (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics	(ug/L)	(mg/kg)		(mg/kg)	(ug/L)	(mg/kg)
Aluminum	339	12,130		8,360	469 J4	7,205
Antimony	ND	ND		B 4.4 J4	ND	ND
Arsenic	B 4 J4	B 1.3 J4		2.7	ND	B 2.1
Barium	B 33.1	46.8		B 35.1	B 11.7	B 53.4
Beryllium	ND	ND		B 0.25	ND	ND
Calcium	58,450	3,995 J4		3,160	6,545	B 2,965
Chromium III	ND	ND		20.4	ND	ND
Chromium (Total)	ND	34.1 J4		20.4	ND	23.3
Cobalt	ND	B 7.2		B 6.7	ND	B 5.9
Copper	ND	18.6		15.3	B 3.8	17.9 J4
Iron	730.5 J4	6,995		12,100	609.5	10,365
Lead	ND	30.8		7.3 J4	ND	23.2
Magnesium	9,980 J4	3,525		4,085	B 1,760	B 3,180
Manganese	614.5	256 J4		201.5	78	160.4
Nickel	B 8.55	28.2		28.9	ND	B 20.1
Potassium	4,330	B 636		B 458	ND	B 495
Silver	B 10.8	ND		ND	ND	ND
Sodium	34,050	B 255		B 155.6	B 1,990	160.4
Vanadium	ND	27.4		27	B 5.5	B 23
Zinc	ND	50.6 J4		44.3	ND	30.7
PAHs	(ug/L)	(mg/kg)		(mg/kg)	(ug/L)	(mg/kg)
Phenanthrene	ND	ND		ND	ND	0.05 J4
Anthracene	ND	ND		ND	ND	ND
Fluoranthene	ND	ND		ND	ND	0.06
Pyrene	ND	ND		0.01	ND	0.08 J4
Benzo(a)anthracene	ND	ND		ND	ND	0.04
Chrysene	ND	ND		ND	ND	0.05
Benzo(b)fluoranthene	ND	ND		0.01	ND	0.05
Benzo(k)fluoranthene	ND	ND		ND	ND	0.04 J4
Benzo(a)pyrene	ND	ND		ND	ND	0.05
Indeno(1,2,3-cd)pyrene	ND	ND		ND	ND	0.07
Benzo(g,h,i)perylene	ND	ND		ND	ND	0.07
Volatiles	(ug/L)	(ug/kg)		(ug/kg)	(ug/L)	(ug/kg)
Methylene Chloride	ND	ND		126 J4	ND	ND
Acetone	ND	ND		71.5	ND	ND
1,1,1-Trichloroethane	ND	22 J4		ND	ND	ND
Toluene	ND	ND		ND	ND	110
Ethylbenzene	ND	ND		ND	ND	J 6
Xylenes (Total)	ND	ND		ND	ND	J 12.5
Semivolatiles	(ug/L)	(ug/kg)		(ug/kg)	(ug/L)	(ug/kg)
4-Methylphenol	ND	J 2,127		ND	ND	ND
bis(2-Ethylhexyl)-phthalate	ND	ND		J 61	37	J 130 J4

TABLE SW-D16

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2516

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season[d] (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Bacteria	MPN/100mL[e]	NA[f]			MPN/100mL	NA
Fecal Coliform	193	--			20	--
Fecal Streptococcus	22	--			14,500	--

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample. A "U" qualifier indicates the analyte was not detected at the concentration indicated.
(c) Location 2516 not sampled during transitional season.
(d) No surface water sample collected at Location 2516 during dry season (no surface water present).
(e) MPN = Most probable number.
(f) NA = Not applicable.

TABLE SW-D17

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2518

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season[d] (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics				(mg/kg)	(µg/L)	(mg/kg)
Aluminum				33,800	1,030	24,900
Arsenic				25.6	B 1.8	16.6 J4
Barium				B 152	B 16.8	78.1
Boron				ND	B 23.1	ND
Cadmium				B 2.6	ND	B 1.5 J4
Calcium				7,720	10,300	4,560
Chromium III				90.9	ND	90.8
Chromium VI				ND	ND	1
Chromium (Total)				90.9	ND	91.8
Cobalt				B 10.1	ND	B 9.7 J4
Copper				251	B 12 J4	149
Iron				24,500	834	16,200
Lead				1,520	34 J4	1,150
Magnesium				7,460	B 4,080	5,130
Manganese				421	28.7	185 J4
Mercury				1.6	ND	0.55 J3
Nickel				ND	ND	40.5
Potassium				ND	B 2,690	B 1,020
Sodium				B 923	21,500	B 622
Vanadium				66	ND	48.7
Zinc				704	99.1	341
PAHs				(mg/kg)	(µg/L)	(mg/kg)
Phenanthrene				0.18	0.3	0.15
Fluoranthene				0.37	0.69	0.32
Pyrene				0.41	0.58	0.3
Benzo(a)anthracene				0.11	0.14	0.1
Chrysene				0.25	0.26	0.16
Benzo(b)fluoranthene				0.39	0.32	0.21
Benzo(k)fluoranthene				0.16	0.2	0.14
Benzo(a)pyrene				0.28	0.26	0.2
Indeno(1,2,3-cd)pyrene				0.44	0.3	0.13
Benzo(g,h,i)perylene				0.43	0.34	0.28
Semivolatiles				(µg/kg)	(µg/L)	(µg/kg)
bis(2-Ethylhexyl)-phthalate				ND	ND	J 1,200
Pesticides/PCBs				(µg/kg)	(µg/L)	(µg/kg)
Aroclor-1260				ND	ND	2,200 JN
Bacteria					MPN/100mL[e]	NA[f]
Fecal Coliform					4	--
Fecal Streptococcus					2	--

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample. A "U" qualifier indicates the analyte was not detected at the concentration indicated.
(c) Location 2518 not sampled during transitional season.
(d) No surface water sample collected at Location 2518 during dry season (no surface water present).
(e) MPN = Most probable number.
(f) NA = Not applicable.
ND Not detected.

TABLE SW-D18

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2519

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season[d] (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics				(mg/kg)	(ug/L)	(mg/kg)
Aluminum				28,200	1,760	21,100
Arsenic				17.6	B 2.3	11.5 J4
Barium				B 122	B 19.5	B 82.9
Boron				ND	B 29	ND
Cadmium				B 1.4	ND	ND
Calcium				6,380	10,800	4,080
Chromium III				93.5	ND	76.2
Chromium (Total)				93.5	ND	76.2
Cobalt				B 10	ND	B 8.1 J4
Copper				257	B 20.9 J4	183
Iron				20,500	1,220	14,400
Lead				1,380	75.3 J4	955
Magnesium				6,200	B 4,370	4,390
Manganese				272	38.9	168 J4
Mercury				1.1	ND	0.93 J3
Nickel				ND	ND	33.4 J4
Potassium				B 1,170	B 2,750	B 819
Selenium				ND	ND	B 0.96
Sodium				B 810	23,100	B 470
Vanadium				57.2	ND	39.5 J4
Zinc				602	114	375
PAHs				(mg/kg)	(ug/L)	(mg/kg)
Phenanthrene				0.36	0.11	1.2
Anthracene				ND	ND	0.17
Fluoranthene				0.78	0.24	ND
Pyrene				0.81	0.22	0.98
Benzo(a)anthracene				0.22	ND	0.3
Chrysene				0.5	ND	0.38
Benzo(b)fluoranthene				0.75	0.11	0.27
Benzo(k)fluoranthene				0.32	ND	0.22
Benzo(a)pyrene				0.56	ND	0.26
Indeno(1,2,3-cd)pyrene				0.75	ND	0.16
Benzo(g,h,i)perylene				0.78	0.13	0.29
Volatiles				(ug/kg)	(ug/L)	(ug/kg)
Acetone				ND	ND	B 600
Semivolatiles				(ug/kg)	(ug/L)	(ug/kg)
bis(2-Ethylhexyl)-phthalate				ND	J 0.6	J 1,100
Di-n-octylphthalate				ND	ND	J 370
Pesticides/PCBs				(ug/kg)	(ug/L)	(ug/kg)
Aroclor-1260				ND	ND	4,000 J4
Bacteria					MPN/100mL[e]	NA[f]
Fecal Coliform					16	--
Fecal Streptococcus					24	--

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample. A "U" qualifier indicates the analyte was not detected at the concentration indicated.
(c) Location 2519 not sampled during transitional season.
(d) No surface water sample collected at Location 2519 during dry season (no surface water present).
MPN = Most probable number.
(e) NA = Not applicable.

TABLE SW-D19

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2520

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season[d] (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics				(mg/kg)	(µg/L)	(mg/kg)
Aluminum				29,500	3,770	28,400
Arsenic				18.3	B 5.4	14.6 J4
Barium				129	B 30.7	B 88.8
Boron				ND	B 25.5	ND
Cadmium				3.8	ND	ND
Calcium				5,590	10,700	4,690
Chromium III				103	0	95.8
Chromium (Total)				103	10.7	95.8
Cobalt				B 8.5	B 5.10	B 10.9 J4
Copper				271	B 43.4 J4	157
Iron				20,800	2,880	18,400
Lead				1,530	171 J4	1,200
Magnesium				6,460	B 4,990	5,740
Manganese				254	68.1	199 J4
Mercury				1.5	ND	0.97 J3
Nickel				66.3	B 11.5	47.6
Potassium				B 759	B 3,340	B 1,290
Selenium				3.5	ND	B 1.1
Sodium				B 684	22,900	B 508
Vanadium				58.3	B 10.6	53.8
Zinc				631	159	408
PAHs				(mg/kg)	(µg/L)	(mg/kg)
Phenanthrene				0.45	0.15	0.27
Anthracene				0.03	ND	0.04
Fluoranthene				0.96	0.31	0.64
Pyrene				1	0.27	0.54
Benzo(a)anthracene				0.28	ND	0.21
Chrysene				0.58	0.1	0.32
Benzo(b)fluoranthene				0.88	0.14	0.4
Benzo(k)fluoranthene				0.38	ND	0.25
Benzo(a)pyrene				0.78	ND	0.37
Indeno(1,2,3-cd)pyrene				1.1	0.12	0.33
Dibenzo(a,h)anthracene				ND	ND	0.08
Benzo(g,h,i)perylene				1.2	0.12	0.39
Volatiles				(µg/kg)	(µg/L)	(µg/kg)
Acetone				ND	ND	B 82
Semivolatiles				(µg/kg)	(µg/L)	(µg/kg)
bis(2-Ethylhexyl)-phthalate				ND	J 1	J 1,100
Pesticides/PCBs				(µg/kg)	(µg/L)	(µg/kg)
Aroclor-1260				ND	ND	1,000 J4

TABLE SW-D19

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2520

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season[d] (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Bacteria					MPN/100mL[e]	NA[f]
Fecal Coliform					320	--
Fecal Streptococcus					480	--

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample. A "U" qualifier indicates the analyte was not detected at the concentration indicated.
(c) Location 2520 not sampled during transitional season.
(d) No surface water sample collected at Location 2520 during dry season (no surface water present).
(e) MPN = Most probable number.
(f) NA = Not applicable.
ND Not detected.

TABLE SW-D20

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2521

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season[d] (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics				(mg/kg)	(µg/L)	(mg/kg)
Aluminum				26,200	4,660	15,900
Arsenic				16.3	B 8	11.2 J4
Barium				111	B 33.8	119
Beryllium				B 0.53	ND	ND
Boron				ND	B 34.4	ND
Cadmium				3	ND	2.4 J4
Calcium				5,260	11,300	3,580
Chromium III				102	0	45.4
Chromium (Total)				102	14.9	45.4
Cobalt				B 9.5	B 5.5	B 6.4 J4
Copper				275	B 61.1 J4	108
Iron				20,200	4,570	12,700
Lead				1,550	97.8 J4	719
Magnesium				5,800	B 4,690	3,290
Manganese				239	122	129 J4
Mercury				0.97	ND	0.56 J3
Nickel				49.2	B 18.4	28.8 J4
Potassium				B 959	B 3,870	B 664
Selenium				2.8 J4	ND	ND
Sodium				B 584	35,900	B 334
Vanadium				56.7	B 11.5	37.8 J4
Zinc				522	193	291
PAHs				(mg/kg)	(µg/L)	(mg/kg)
Phenanthrene				0.24	0.15	0.13
Fluoranthene				0.41	0.33	0.36
Pyrene				0.45	0.3	0.3
Benzo(a)anthracene				0.11	ND	0.11
Chrysene				0.24	0.13	0.18
Benzo(b)fluoranthene				0.38	0.16	0.26
Benzo(k)fluoranthene				0.13	ND	0.15
Benzo(a)pyrene				0.26	0.12	0.18
Indeno(1,2,3-cd)pyrene				0.39	0.16	0.23
Benzo(g,h,i)perylene				0.46	0.19	0.24
Volatiles				(µg/kg)	(µg/L)	(µg/kg)
Toluene				ND	ND	J 8
Semivolatiles				(µg/kg)	(µg/L)	(µg/kg)
N-nitrosodiphenylamine				ND	J 1	ND
bis(2-Ethylhexyl)-phthalate				ND	J 0.7	J 750
Pesticides/PCBs				(µg/kg)	(µg/L)	(µg/kg)
Aroclor-1260				980 J3	ND	1,500 JN

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2521

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season[d] (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Bacteria					MPN/100mL[e]	NA[f]
Fecal Coliform					1,100	--
Fecal Streptococcus					940	--

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample. A "U" qualifier indicates the analyte was not detected at the concentration indicated.
(c) Location 2521 not sampled during transitional season.
(d) No surface water sample collected at Location 2521 during dry season (no surface water present).
(e) MPN = Most probable number.
(f) NA = Not applicable.
ND Not detected.

TABLE SW-D21

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2522

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season[d] (August 1991)		Wet Season[d] (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics				(mg/kg)		(mg/kg)
Aluminum				38,700		25,300
Arsenic				18.3		11.5 J4
Barium				139		109
Beryllium				B 0.72		ND
Cadmium				B 2		B 1.2 J4
Calcium				6,910		5,500
Chromium III				143		80.6
Chromium (Total)				143		81.6
Cobalt				B 10.9		B 13.2 J4
Copper				327		214
Iron				27,400		20,100
Lead				1,760		1,000
Magnesium				8,470		5,510
Manganese				325		279 J4
Mercury				1.6		0.77 J3
Nickel				59.3		45.2
Potassium				B 1,220		B 1,520
Selenium				B 1.4		ND
Sodium				B 704		B 520
Vanadium				72.9		51.2
Zinc				567		395
PAHs				(mg/kg)		(mg/kg)
Fluorene				0.07		ND
Phenanthrene				0.79		1.2
Anthracene				0.04		ND
Fluoranthene				1.7		2.3
Pyrene				1.6		2
Benzo(a)anthracene				0.39		0.53
Chrysene				0.95		1
Benzo(b)fluoranthene				1.6		1.4
Benzo(k)fluoranthene				0.68		0.75
Benzo(a)pyrene				1.2		0.92
Indeno(1,2,3-cd)pyrene				1.9		1.3
Benzo(g,h,i)perylene				2.2		1.3
Volatiles				(ug/kg)		(ug/kg)
Methylene Chloride				B 2,000 J4		ND
Semivolatiles				(ug/kg)		(ug/kg)
Butylbenzylphthalate				ND		J 260
bis(2-Ethylhexyl)-phthalate				ND		4,500
Pesticides/PCBs				(ug/kg)		(ug/kg)
Endrin				170 J3		ND
Endosulfan II				49 J3		ND
4,4-DDD				40 J3		ND
Endrin ketone				80 J3		ND
Aroclor-1260				ND		1,300 J4

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample. A "U" qualifier indicates the analyte was not detected at the concentration indicated.
(c) Location 2522 not sampled during transitional season.
(d) No surface water sample collected at Location 2522 during dry and wet seasons (no surface water present).
ND Not detected.

TABLE SW-D22

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2523

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season[d] (August 1991)		Wet Season[d] (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics				(mg/kg)		(mg/kg)
Aluminum				25,900		25,900
Arsenic				13.8		16.1 J4
Barium				2,550		96.2
Cadmium				B 2.1		2.9 J4
Calcium				4,940		4,010
Chromium III				88.3		75.5
Chromium (Total)				88.3		75.5
Cobalt				B 7.8		B 9.2 J4
Copper				310		263
Iron				18,700		17,900
Lead				1,270		981
Magnesium				5,840		5,120
Manganese				214		170 J4
Mercury				1.3		0.78 J3
Nickel				39.4		40.5
Potassium				B 875		B 1,220
Selenium				ND		B 0.86
Sodium				B 548		B 479
Vanadium				52.6		59.5
Zinc				2,460		355
PAHs				(mg/kg)		(mg/kg)
Fluorene				0.1		ND
Phenanthrene				1.2		2
Anthracene				0.09		ND
Fluoranthene				2		4.2
Pyrene				1.9		2.8
Benzo(a)anthracene				0.49		0.84
Chrysene				1.2		1.6
Benzo(b)fluoranthene				1.7		2
Benzo(k)fluoranthene				0.77		1.2
Benzo(a)pyrene				1.3		1.8
Indeno(1,2,3-cd)pyrene				1.8		1.8
Benzo(g,h,i)perylene				1.7		1.9
Semivolatiles				(ug/kg)		(ug/kg)
Butylbenzylphthalate				ND		J 400 J4
bis(2-Ethylhexyl)-phthalate				ND		J 6,800 J4
Pesticides/PCBs				(ug/kg)		(ug/kg)
Aroclor-1260				ND		980 JN

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample. A "U" qualifier indicates the analyte was not detected at the concentration indicated.
(c) Location 2523 not sampled during transitional season.
(d) No surface water sample collected at Location 2523 during dry and wet seasons (no surface water present).
ND Not detected.

TABLE SW-D23

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2524

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season[d] (August 1991)		Wet Season[d] (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics				(mg/kg)		(mg/kg)
Aluminum				29,700		27,800
Arsenic				15.8		11.4 J4
Barium				140		99.2
Cadmium				B 2.4		B 1.4 J4
Calcium				6,020		4,400
Chromium III				78.7		94.3
Chromium (Total)				78.7		94.3
Cobalt				B 11.3		B 9.5 J4
Copper				202		243
Iron				25,200		20,000
Lead				776		1,200
Magnesium				7,070		5,820
Manganese				284		204 J4
Mercury				0.81		1.2 J3
Nickel				58.7		46.1
Potassium				B 1,540		B 1,050
Sodium				B 736		B 496
Vanadium				66.1		56.9
Zinc				566		430
PAHs				(mg/kg)		(mg/kg)
Fluorene				0.14		ND
Phenanthrene				2.5		1.5
Anthracene				0.12		ND
Fluoranthene				5.6		3.9
Pyrene				5		2.7
Benzo(a)anthracene				1.6		0.98
Chrysene				3.7		2
Benzo(b)fluoranthene				5		3.1
Benzo(k)fluoranthene				2.4		1.8
Benzo(a)pyrene				3.6		2
Indeno(1,2,3-cd)pyrene				4.6		2.6
Benzo(g,h,i)perylene				4.2		2.5
Volatiles				(ug/kg)		(ug/kg)
Toluene				32		ND
Semivolatiles				(ug/kg)		(ug/kg)
bis(2-Ethylhexyl)-phthalate				ND		15,000 J4
Pesticides/PCBs				(ug/kg)		(ug/kg)
Aroclor-1260				ND		1,100 JN

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample. A "U" qualifier indicates the analyte was not detected at the concentration indicated.
(c) Location 2524 not sampled during transitional season.
(d) No surface water sample collected at Location 2524 during dry and wet seasons (no surface water present).
ND Not detected.

TABLE SW-D24

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2525

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season[d] (August 1991)		Wet Season[d] (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics				(mg/kg)		(mg/kg)
Aluminum				35,400		31,600
Antimony				ND		B 15.9 J4
Arsenic				20		17
Barium				B 149		B 125
Cadmium				B 3.8		B 1.4 J4
Calcium				6,510		5,830
Chromium III				99.2		614
Chromium (Total)				99.2 J4		614
Cobalt				B 13.1		B 15.5
Copper				309		282 J4
Iron				25,100		25,000
Lead				320		1,030
Magnesium				7,580		6,710
Manganese				287 J4		306
Mercury				1.3		1.1
Nickel				ND		408
Potassium				B 1,740		B 1,580
Sodium				ND		B 774
Vanadium				74.1		72.4
Zinc				659 J4		508
PAHs				(mg/kg)		(mg/kg)
Phenanthrene				1.2		2
Anthracene				0.06		ND
Fluoranthene				2.8		5.4
Pyrene				2.5		3.9
Benzo(a)anthracene				0.57		1.5
Chrysene				1.3		2.7
Benzo(b)fluoranthene				1.3		3.7
Benzo(k)fluoranthene				0.9		2.1
Benzo(a)pyrene				1.4		2.6
Indeno(1,2,3-cd)pyrene				ND		2.9
Benzo(g,h,i)perylene				1.4		3.0
Volatiles				(ug/kg)		(ug/kg)
Acetone				B 420 J4		ND
Semivolatiles				(ug/kg)		(ug/kg)
Carbazole				ND		J 410
Butylbenzylphthalate				ND		J 460
bis(2-Ethylhexyl)-phthalate				ND		18,000
Pesticides/PCBs				(ug/kg)		(ug/kg)
Aroclor - 1260				ND		1,000 JN

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample. A "U" qualifier indicates the analyte was not detected at the concentration indicated.
(c) Location 2525 not sampled during transitional season.
(d) No surface water sample collected at Location 2525 during dry and wet seasons (no surface water present).
ND Not detected.

TABLE SW-D25

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2526

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season[d] (August 1991)		Wet Season[d] (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics				(mg/kg)		(mg/kg)
Aluminum				15,300		35,300
Arsenic				18		17
Barium				B 86		171
Cadmium				B 3.6		B 3.3 J4
Calcium				B 3,740		7,500
Chromium III				43.3		107
Chromium (Total)				43.3 J4		107
Cobalt				B 6.1		B 15.7
Copper				156		252 J4
Iron				12,100		29,200
Lead				121 J4		919
Magnesium				B 3,440		8,090
Manganese				136 J4		340
Mercury				1.5		0.74
Nickel				ND		69.3
Potassium				B 1,350		B 1,820
Selenium				ND		B 0.92 J4
Sodium				ND		B 907
Vanadium				B 43.1		77.8
Zinc				435 J4		793
PAHs				(mg/kg)		(mg/kg)
Phenanthrene				0.88		1.7
Anthracene				0.06		ND
Fluoranthene				2.2		4.6
Pyrene				2		3.3
Benzo(a)anthracene				0.64		1.2
Chrysene				1.4		2.1
Benzo(b)fluoranthene				1.5		2.7
Benzo(k)fluoranthene				0.79		1.5
Benzo(a)pyrene				1.7		1.9
Indeno(1,2,3-cd)pyrene				1.6		2.2
Benzo(g,h,i)perylene				1.7		2.2
Volatiles				(ug/kg)		(ug/kg)
Chloromethane				ND		J 22
Acetone				B 640 J4		B 110
Toluene				ND		73 J4
Semivolatiles				(ug/kg)		(ug/kg)
Carbazole				J 930		ND
Butylbenzylphthalate				J 1,200		J 560 J4
bis(2-Ethylhexyl)-phthalate				26,000		20,000 J4
Pesticides/PCBs				(ug/kg)		(ug/kg)
4,4-DDT				110 J3		ND
Aroclor-1260				ND		1,300 JN

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample. A "U" qualifier indicates the analyte was not detected at the concentration indicated.
(c) Location 2526 not sampled during transitional season.
(d) No surface water sample collected at Location 2526 during dry and wet seasons (no surface water present).
ND Not detected.

TABLE SW-D26

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2527

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics			(ug/L)	(mg/kg)	(ug/L)	(mg/kg)
Aluminum			1,440	11,500	5,990	29,100
Antimony			ND	ND	ND	B 13.2 J4
Arsenic			ND	18.7	B 6.8	25.7
Barium			B 31.9 J4	B 76	B 43.5	160
Boron			ND	ND	B 29.9	ND
Cadmium			ND	B 2.4	ND	4.5 J4
Calcium			23,600	2,640	14,600	6,100
Chromium III			ND	33	0	97.3
Chromium (Total)			B 5.1	33 J4	15.5	97.3
Cobalt			ND	B 3.6	ND	B 11.6
Copper			B 9.2	126	B 48 J4	277 J4
Iron			2,990	8,350	4,910	22,200
Lead			46.4	462	219 J4	1,150
Magnesium			6,800	B 2,340	7,350	6,190
Manganese			398	89.9 J4	103	235
Mercury			ND	0.31	0.28	0.88
Nickel			ND	ND	B 18.2	55.7
Potassium			6,550	B 590	B 3,080	B 1,240
Selenium			ND	ND	ND	B 0.73 J4
Silver			ND	B 2.3	ND	ND
Sodium			176,000	ND	19,200	B 1,250
Vanadium			B 7.9	28.1	B 14.8	72.7
Zinc			69.3	462 J4	215	1,100
PAHs			(ug/L)	(mg/kg)	(ug/L)	(mg/kg)
Fluorene			ND	0.05	ND	ND
Phenanthrene			0.24	1	0.6	4.7 J4
Anthracene			ND	0.04	ND	ND
Fluoranthene			ND	2.4	1.5	14 J4
Pyrene			0.37	2	1.2	13 J4
Benzo(a)anthracene			ND	0.46	0.36	4.9 J4
Chrysene			0.16	1.5	0.67	8.5 J4
Benzo(b)fluoranthene			0.16	1.3	0.66	8.3 J4
Benzo(k)fluoranthene			ND	0.58	0.43	4.6 J4
Benzo(a)pyrene			ND	1.73	0.56	6.6 J4
Indeno(1,2,3-cd)pyrene			ND	1.2	0.59	6.1 J4
Benzo(g,h,i)perylene			ND	1.1	0.65	6.5
Volatiles			(ug/L)	(ug/kg)	(ug/L)	(ug/kg)
Acetone			ND	1,300 J4	ND	ND
2-Butanone			ND	580 J4	ND	ND
4-Methyl 2 Pentanone			ND	J 16 J4	ND	ND
2-Hexanone			ND	820 J4	ND	ND
Toluene			J 4	6,400 J4	ND	91 J4
Xylenes (Total)			ND	J 42 J4	ND	ND

TABLE SW-D26

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2527

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Semivolatiles			(µg/L)	(µg/kg)	(µg/L)	(µg/kg)
4-Methylphenol			J 4	ND	ND	ND
bis(2-Ethylhexyl)-phthalate			J 5	J 16,000 J4	J 7	35,000 J4
Di-n-octylphthalate			ND	ND	ND	J 1,200 J4
Pesticides/PCBs			(µg/L)	(µg/kg)	(µg/L)	(µg/kg)
Alpha-BHC			ND	43 J3	ND	ND
Aldrin			ND	20 J3	ND	ND
4,4-DDE			ND	42 NJ	ND	ND
Endrin			ND	95 J3	ND	ND
Endosulfan II			ND	130 J3	ND	ND
Ensodulfan sulfate			ND	140 J3	ND	ND
4,4-DDT			ND	220 J	ND	ND
Methoxyclor			ND	220 J3	ND	ND
Endrin ketone			ND	83 J3	ND	ND
Aroclor-1260			ND	ND	ND	1,500 J4
Bacteria			MPN/100mL[d]	NA[e]	MPN/100mL	NA
Fecal Coliform			270,000	--	1,800	--
Fecal Streptococcus			240,000	--	5,300	--

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample. A "U" qualifier indicates the analyte was not detected at the concentration indicated.
(c) Location 2527 not sampled during transitional season.
(d) MPN = Most probable number.
(e) NA = Not applicable.
ND Not detected.

TABLE SW-D27

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2528

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics			(ug/L)	(mg/kg)	(ug/L)	(mg/kg)
Aluminum			80,900	24,500	1,640 J4	29,200
Arsenic			24.8	12.6	ND	19.6
Barium			773 J4	123	B 18.6	161
Beryllium			B 1.9	ND	ND	ND
Boron			B 34.6	ND	ND	ND
Cadmium			18.3	4.5	ND	4.3
Calcium			39,500	5,800	12,800	6,910 J4
Chromium III			ND	73.3	0	97.1
Chromium (Total)			193	73.3 J4	ND	97.1
Cobalt			B 24.1	B 8.9	ND	B 11.9
Copper			2,980	262	B 11.6	302 J4
Iron			58,700	17,700	1,380	21,200
Lead			ND	962	39.6 J4	1,020
Magnesium			24,400	5,580	5,540	6,560
Manganese			865	207 J4	45.5	245
Mercury			0.49	1.1	ND	0.98
Nickel			ND	ND	ND	57.7
Potassium			11,500	B 1,210	B 3,400	B 1,360
Sodium			149,000	ND	29,800	B 697
Vanadium			146	57.2	B 8.8	71.5
Zinc			3,160	726 J4	111	965
PAHs			(ug/L)	(mg/kg)	(ug/L)	(mg/kg)
Fluorene			ND	0.11	ND	ND
Phenanthrene			3.8	1.6	0.22	5.4 J4
Anthracene			ND	0.12	ND	0.42 J4
Fluoranthene			8.2	3.6	0.58	16 J4
Pyrene			7.5	3.3	0.41	12 J4
Benzo(a)anthracene			ND	1.1	0.13	4.5 J4
Chrysene			4.4	2.3	0.22	8 J4
Benzo(b)fluoranthene			3.9	2.7	0.21	9 J4
Benzo(k)fluoranthene			2.1	1.5	0.14	5.1 J4
Benzo(a)pyrene			3.8	3.1	0.15	6.4 J4
Indeno(1,2,3-cd)pyrene			ND	2.8	0.16	6 J4
Dibenzo(a,h)anthracene			ND	0.15	ND	1.2 J4
Benzo(g,h,i)perylene			3.7	2.8	0.18	5.8 J4
Volatiles			(ug/L)	(ug/kg)	(ug/L)	(ug/kg)
Acetone			ND	D 770 J4	ND	ND
Chloroform			J 1	ND	ND	ND
Toluene			J 4	1,000	ND	ND
Semivolatiles			(ug/L)	(ug/kg)	(ug/L)	(ug/kg)
4-Nitrophenol			ND	ND	J 2 J4	ND
Diethylphthalate			ND	ND	J 0.9	ND
Butylbenzylphthalate			ND	J 2,000	ND	J 960
bis(2-Ethylhexyl)-phthalate			55	53,000	J 6	28,000 J4
Di-n-octylphthalate			ND	J 840	ND	J 800 J4

TABLE SW-D27

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2528

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Pesticides/PCBs			(ug/L)	(ug/kg)	(ug/L)	(ug/kg)
Endrin			ND	110 J3	ND	ND
Endosulfan II			ND	61 J3	ND	ND
4,4-DDT			ND	190 J3	ND	ND
Aroclor-1260			ND	ND	ND	2,400 JN
Bacteria			MPN/100mL[d]	NA[e]	MPN/100mL	NA
Fecal Coliform			90,000	--	5,000	--
Fecal Streptococcus			120,000	--	5,900	--

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample. A "U" qualifier indicates the analyte was not detected at the concentration indicated.
(c) Location 2528 not sampled during transitional season.
(d) MPN = Most probable number.
(e) NA = Not applicable.
ND Not detected.

TABLE SW-D28

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2529

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics			(ug/L)	(mg/kg)	(ug/L)	(mg/kg)
Aluminum			2,070	11,200	1,270 J4	23,400
Antimony			ND	ND	ND	B 11.9 J4
Arsenic			ND	20	ND	18.3
Barium			B 41.2 J4	B 60.1	B 18.3	117
Boron			B 25.1	ND	ND	ND
Cadmium			ND	B 3.3	ND	6.1
Calcium			19,500	B 3,510	10,500	5,650
Chromium III			ND	38.5	0	83.3
Chromium (Total)			ND	38.5 J4	B 7.3	83.3
Cobalt			ND	B 5.7	ND	B 10.6
Copper			B 5.2	178	B 10.5	290 J4
Iron			4,680	9,340	1,160	18,300
Lead			68.4	771	15.6 J4	1,750
Magnesium			6,410	B 2,570	B 3,890	5,430
Manganese			118	95.2 J4	47.1	203
Mercury			ND	1.5	ND	0.74
Nickel			ND	ND	ND	48.3
Potassium			B 2,460	B 783	B 3,420	B 1,290
Sodium			108,000	ND	31,900	B 813
Vanadium			ND	B 37.1	B 5.8	65
Zinc			126	1,800 J4	112	605
PAHs			(ug/L)	(mg/kg)	(ug/L)	(mg/kg)
Fluorene			ND	0.23	ND	ND
Phenanthrene			0.43	3.5	0.21	4.9 J4
Anthracene			0.06	0.3	ND	0.41
Fluoranthene			0.47	7.5	0.59	13
Pyrene			0.99	6.9	0.42	9.7 J4
Benzo(a)anthracene			0.31	2.2	ND	3.5
Chrysene			0.62	4.4	0.22	5.9
Benzo(b)fluoranthene			0.65	4.7	0.19	7
Benzo(k)fluoranthene			0.28	2.4	0.12	4 J4
Benzo(a)pyrene			0.47	5.6	0.13	5.3
Indeno(1,2,3-cd)pyrene			0.59	4.7	0.14	5
Dibenzo(a,h)anthracene			ND	ND	ND	0.98 J4
Benzo(g,h,i)perylene			0.48	4.9	0.17	4.9
Volatiles			(ug/L)	(ug/kg)	(ug/L)	(ug/kg)
Chloromethane			ND	ND	ND	J 20
Acetone			ND	920 J4	ND	B 140
Toluene			J 2	1,300	ND	J 27 J4
Semivolatiles			(ug/L)	(ug/kg)	(ug/L)	(ug/kg)
4-Nitrophenol			ND	ND	J 1 J4	ND
Butylbenzylphthalate			ND	J 2,000	ND	J 600
bis(2-Ethylhexyl)-phthalate			ND	38,000	J 2	15,000

TABLE SW-D28

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2529

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Pesticides/PCBs			(ug/L)	(ug/kg)	(ug/L)	(ug/kg)
Endrin			ND	140 J3	ND	ND
4,4-DDT			ND	230 J3	ND	ND
Endrin ketone			ND	90 J3	ND	ND
Aroclor-1260			ND	ND	ND	1,200 JN
Bacteria			MPN/100mL[d]	NA[e]	MPN/100mL	NA
Fecal Coliform			6,000	--	2,900	--
Fecal Streptococcus			6,200	--	7,000	--

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample. A "U" qualifier indicates the analyte was not detected at the concentration indicated.
(c) Location 2529 not sampled during transitional season.
(d) MPN = Most probable number.
(e) NA = Not applicable.
ND Not detected.

TABLE SW-D29

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2530

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Inorganics			(ug/L)	(mg/kg)	(ug/L)	(mg/kg)
Aluminum			674	35,500	1,470 J4	20,100
Antimony			ND	ND	ND	33.9 J4
Arsenic			ND	41.8	ND	23.2
Barium			B 14.8 J4	229	B 18.6	237
Beryllium			ND	B 1.1	ND	B 0.55
Boron			B 27.4	ND	ND	B 13.6 J4
Cadmium			ND	B 3.7	ND	3.4 J4
Calcium			15,300	8,020	11,500	6,280
Chromium III			ND	101	ND	72.1
Chromium (Total)			ND	101 J4	ND	72.1
Cobalt			ND	B 13.2	ND	B 20
Copper			B 9	781	B 12.3	884 J4
Iron			1,430	59,800	1,360	105,000
Lead			33	2,050	15.7 J4	1,590
Magnesium			B 4,260	7,240	B 4,620	6,540
Manganese			80.9	415 J4	67.4	584
Mercury			ND	1.4	ND	0.43
Nickel			ND	ND	ND	105
Potassium			5,410	B 1,090	B 3,220	B 1,040
Sodium			116,000	ND	31,100	B 619
Vanadium			B 9.1	93	B 6.9	58.2
Zinc			35.7	1,800 J4	140	2,060
PAHs			(ug/L)	(mg/kg)	(ug/L)	(mg/kg)
Fluorene			ND	0.12	ND	ND
Phenanthrene			0.3	1.1	0.21	5 J4
Anthracene			0.06	0.12	ND	ND
Fluoranthene			0.55	2.5	0.64	15
Pyrene			0.39	2.4	0.4	11 J4
Benzo(a)anthracene			ND	0.73	ND	3.6
Chrysene			0.15	1.6	0.16	6.6
Benzo(b)fluoranthene			0.13	1.9	0.1	6.8
Benzo(k)fluoranthene			ND	0.81	ND	4 J4
Benzo(a)pyrene			ND	1.8	ND	4.6
Indeno(1,2,3-cd)pyrene			0.12	1.7	ND	ND
Benzo(g,h,i)perylene			ND	1.7	ND	4.6
Volatiles			(ug/L)	(ug/kg)	(ug/L)	(ug/kg)
Chloromethane			ND	J 8	ND	J 39
Methylene Chloride			ND	B 250 J4	ND	ND
Acetone			ND	600 J4	ND	ND
Chloroform			J 2	ND	ND	ND
Toluene			J 2	73	ND	J 29
Semivolatiles			(ug/L)	(ug/kg)	(ug/L)	(ug/kg)
4-Methylphenol			ND	ND	ND	J 520
Diethylphthalate			ND	ND	J 0.6	ND
bis(2-Ethylhexyl)-phthalate			ND	J 8,400	J 1	21,000
Di-n-octylphthalate			ND	ND	ND	J 620

TABLE SW-D29

SUMMARY OF DETECTED CONCENTRATIONS FOR SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM ONSITE LOCATION 2530

Analyte	Concentration[a,b]					
	Transitional Season[c] (March/April 1991)		Dry Season (August 1991)		Wet Season (January 1992)	
	Surface Water	Sediment	Surface Water	Sediment	Surface Water	Sediment
Bacteria			MPN/100mL[d]	NA[e]	MPN/100mL	NA
Fecal Coliform			100,0000	--	2,200	--
Fecal Streptococcus			2,400	--	2,400	--

(a) Letters preceding the concentration value are laboratory qualifiers. Letters following the concentration value are data validation qualifiers.
(b) Concentrations are listed if analyte was detected in at least one seasonal sample. A "U" qualifier indicates the analyte was not detected at the concentration indicated.
(c) Location 2530 not sampled during transitional season.
(d) MPN = Most probable number.
(e) NA = Not applicable.
ND Not detected.

APPENDIX SW-E

MASS LOADING CALCULATIONS FOR SURFACE WATER RUNOFF

STF-SURFACE WATER
RUNOFF MASS LOADING
METALS

11 MAY 1992
K/J 916055.10
RUNOFF.MCD

PURPOSE

The purpose of these caculations is to estimate the mass of chemicals that is transported off the South Tacoma Field site by storm runoff. There is only one discharge point for runoff from the site. This discharge point is a 72-inch concrete pipe located at Madison Street. A flow meter has continously monitored flow through this pipe for the investigation period. During the investigation period there were six runoff events. These events occured on the following dates:

01 April - 11 April 1991

11 November - 14 November 1991

25 November - 28 November 1991

06 December - 10 December 1991

27 January - 04 February 1992

18 February - 24 February 1992

Runoff water samples were collected 2 April 1991, 27 November 1991, 28 January 1992, 3 February, and 19 February 1992 and analyzed for chemical concentration. Based on these measured concentrations and the measured flowrates the mass of chemical runoff will be estimated. For un-sampled runoff events the chemical concentration will be assumed equal to the mean of the five samples collected.

FLOWRATE

The flowrate of runoff was recorded by a flowmeter in the 72-inch concrete pipe located at Madison Street.

Read Runoff Data Files

ORIGIN≡1 define matrice orgin as 1

$mgd := 1 \cdot 10^6 \cdot \frac{gal}{day}$ define million gallons per day

APRIL1 := READPRN(april1) read 1 April 91 data file

NOV11 := READPRN(nov11) read 11 November 91 data file

NOV25 := READPRN(nov25) read 25 November 91 data file

DEC6 := READPRN(dec6) read 6 December 91 data file

JAN27 := READPRN(jan27) read 27 January 92 data file

FEB18 := READPRN(feb18) read 18 February 92 data file

$t_{apr1} := APRIL1^{<1>} \cdot day$

$Q_{apr1} := APRIL1^{<2>} \cdot mgd$

$Napr1 := length(t_{apr1})$

$i := 1..Napr1$

$t_{nov11} := NOV11^{<1>} \cdot day$

$Q_{nov11} := NOV11^{<2>} \cdot mgd$

$Nnov11 := length(t_{nov11})$

$j := 1..Nnov11$

$t_{nov25} := NOV25^{<1>} \cdot day$

$Q_{nov25} := NOV25^{<2>} \cdot mgd$

$Nnov25 := length(t_{nov25})$

$k := 1..Nnov25$

$t_{dec6} := DEC6^{<1>} \cdot day$

$Q_{dec6} := DEC6^{<2>} \cdot mgd$

$Ndec6 := length(t_{dec6})$

$m := 1..Ndec6$

$t_{jan27} := JAN27^{<1>} \cdot day$ $\quad Njan27 := length(t_{jan27})$

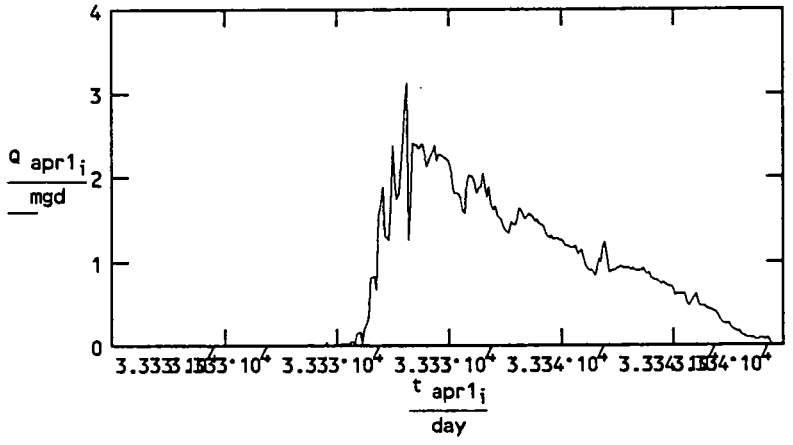
$Q_{jan27} := JAN27^{<2>} \cdot mgd$ $\quad p := 1..Njan27$

$t_{feb18} := FEB18^{<1>} \cdot day$ $\quad Nfeb18 := length(t_{feb18})$

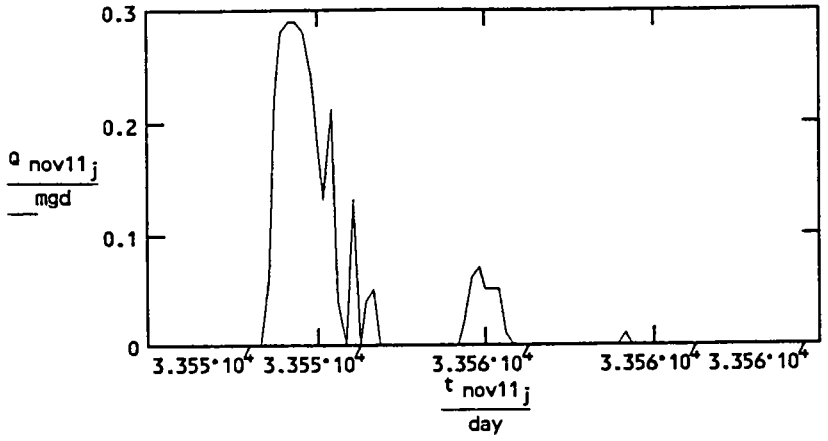
$Q_{feb18} := FEB18^{<2>} \cdot mgd$ $\quad z := 1..Nfeb18$

GRAPHS OF RUNOFF EVENTS

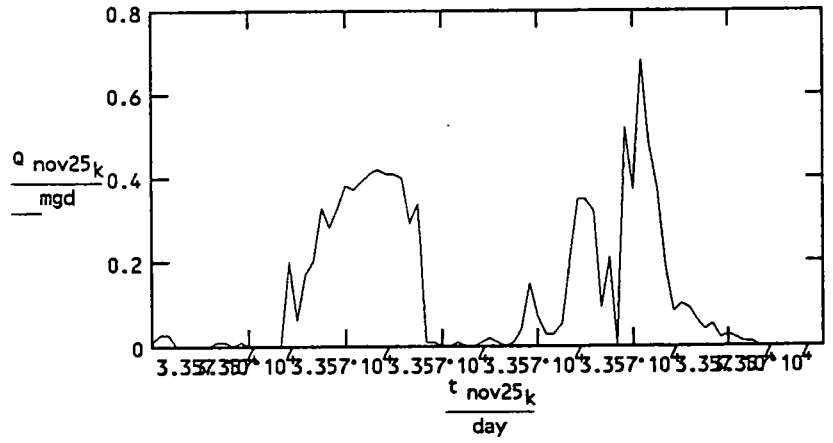
1 April 91 - 11 April 91



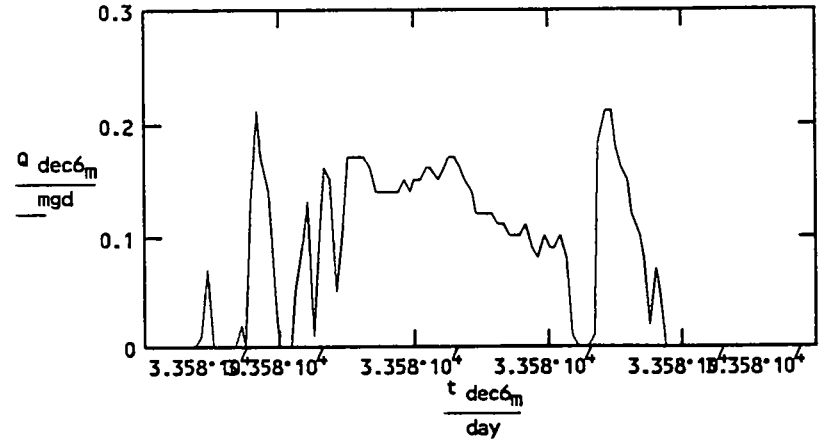
11 November 91 - 14 November 91



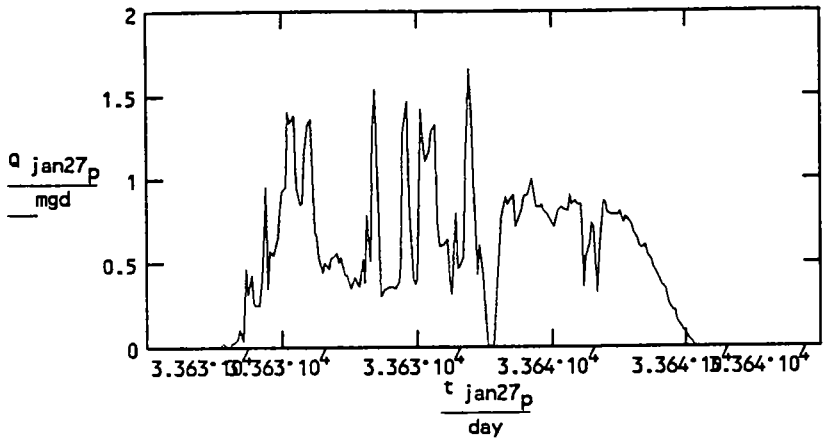
25 November 91 - 28 November 91



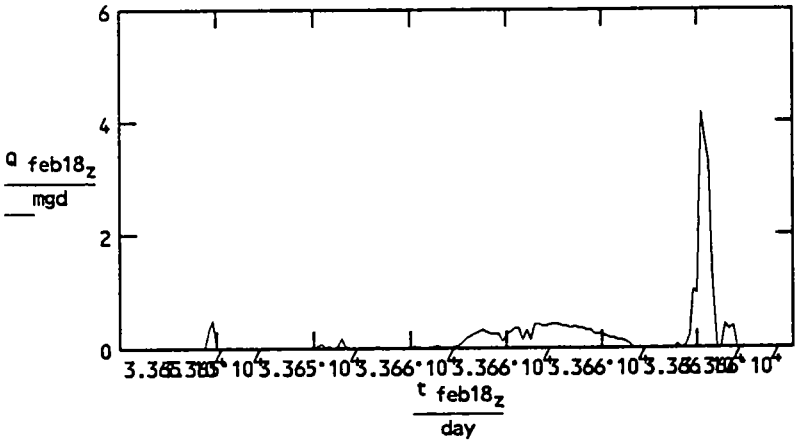
6 December 91 - 10 November 91



27 January 92 - 4 February 92



18 February 92 - 19 February 92



VOLUME OF RUNOFF

$V_{apr1} := \sum_i Q_{apr1_i} \cdot (1 \cdot hr)$ $\quad V_{apr1} = 8.53 \cdot 10^6 \cdot gal$

$V_{nov11} := \sum_j Q_{nov11_j} \cdot (1 \cdot hr)$ $\quad V_{nov11} = 1.15 \cdot 10^5 \cdot gal$

$V_{nov25} := \sum_k Q_{nov25_k} \cdot (1 \cdot hr)$ $\quad V_{nov25} = 4.41 \cdot 10^5 \cdot gal$

$V_{dec6} := \sum_m Q_{dec6_m} \cdot (1 \cdot hr)$ $\quad V_{dec6} = 3.54 \cdot 10^5 \cdot gal$

$V_{jan27} := \sum_p Q_{jan27_p} \cdot (1 \cdot hr)$ $\quad V_{jan27} = 4.43 \cdot 10^6 \cdot gal$

$V_{feb18} := \sum_z Q_{feb18_z} \cdot (1 \cdot hr)$ $\quad V_{feb18} = 1.21 \cdot 10^6 \cdot gal$

$Vtotal := V_{apr1} + V_{nov11} + V_{nov25} + V_{dec6} + V_{jan27} + V_{feb18}$

$Vtotal = 1.51 \cdot 10^7 \cdot gal$ total runoff volume

RUNOFF CONCENTRATION

Five samples were collected during four of the runoff events. It will be assumed that the chemical concentration found in the sample is representitive of the chemical concentration thoughout the runoff event; with the exception of the 27 January 1992 event when two samples were collected. For the 27 January 1992 event it will be assumed that the first sample is representitive of the inital part of the runoff event and the second sample is representitve of the later part of the runoff event. The sample dates are as follows:

Beginning Date of Storm Event	Sample Date
2 April 1991	2 April 1991
25 November 1991	27 November 1991
27 January 1992	*28 January 1992 & 3 February 1992
18 February 1992	19 February 1992

* Both samples taken during 27 January 1992 storm event

For the un-sampled runoff events it will be assumed that the runoff concentration is equal to the mean of the five samples collected.

Julian Date of Sampling Events

dapr2 := 33330·day

dnov27 := 33569·day

djan28 := 33631·day

dfeb3 := 33637·day

dfeb19 := 33653·day

Sample Concentrations

$ug := 1 \cdot 10^{-6} \cdot gm$ define microgram

CONC := READPRN(concv1) read concentration data file

$C_{apr2} := CONC^{<1>} \cdot \frac{ug}{liter}$

$C_{nov27} := CONC^{<2>} \cdot \frac{ug}{liter}$

$C_{jan28} := CONC^{<3>} \cdot \frac{ug}{liter}$

$C_{feb3} := CONC^{<4>} \cdot \frac{ug}{liter}$

$C_{feb19} := CONC^{<5>} \cdot \frac{ug}{liter}$

$C_{avg} := CONC^{<6>} \cdot \frac{ug}{liter}$

Nmetals := length(C_{apr2})

Nmetals = 17 number of metals

w := 1..Nmetals

ECHO INPUT CONCENTRATIONS

2 Apr, 27 Nov, 28 Jan, 3 Feb, 19 Feb, Mean

CONC =

						METAL (ug/L)
4040	843	1200	1080	1110	1654.6	Aluminum
4	2.1	1.4	1.2	0.5	1.8	Arsenic
31.2	17.6	16.8	18.1	15.7	19.9	Barium
11.1	39.8	12.9	8.3	3.5	15.1	Boron
8	2	3.5	3.5	3.5	4.1	Chromium
3.4	2.5	1.5	1.5	1.5	2.1	Cobalt
2.4	9.2	5.6	6.1	5.2	5.7	Copper
2610	1040	1290	1060	1060	1412	Iron
4.7	8.9	2.3	2.7	9.5	5.6	Lead
1230	1760	2170	1570	1910	1728	Magnesium
52.6	28.1	29	28.5	21.1	31.9	Maganese
0.1	0.1	0.1	0.1	0.1	0.1	Mercury
6.8	7	7.7	10.1	4	7.1	Nickel
1130	2350	1950	2130	1680	1848	Potassium
2090	14700	16200	13200	11200	11478	Sodium
1.7	2	2	2.6	4.2	2.5	Vanadium
22.4	40.4	48	39.2	33.9	36.8	Zinc

CALCULATE MASS OF RUNOFF

$$mapr1_{(i,w)} := Q\ apr1_i \cdot C\ apr2_w \cdot (1-hr)$$

$$mnov11_{(j,w)} := Q\ nov11_j \cdot C\ avg_w \cdot (1-hr)$$

$$mnov25_{(k,w)} := Q\ nov25_k \cdot C\ nov27_w \cdot (1-hr)$$

$$mdec6_{(m,w)} := Q\ dec6_m \cdot C\ avg_w \cdot (1-hr)$$

$$mjan27_{(p,w)} := if\left[t\ jan27_p \le \frac{(djan28 + dfeb3)}{2}, Q\ jan27_p \cdot C\ jan28_w \cdot (1-hr), Q\ jan27_p \cdot C\ feb3_w \cdot (1-hr)\right]$$

$$mfeb18_{(z,w)} := Q\ feb18_z \cdot C\ feb19_w \cdot (1-hr)$$

$$Mapr1_w := \Sigma mapr1^{\langle w \rangle}$$

$$Mnov11_w := \Sigma mnov11^{\langle w \rangle}$$

$$Mnov25_w := \Sigma mnov25^{\langle w \rangle}$$

$$Mdec6_w := \Sigma mdec6^{\langle w \rangle}$$

$$Mjan27_w := \Sigma mjan27^{\langle w \rangle}$$

$$Mfeb18_w := \Sigma mfeb18^{\langle w \rangle}$$

TotalMass := Mapr1 + Mnov11 + Mnov25 + Mdec6 + Mjan27 + Mfeb18

Temp1 := augment(Mapr1,augment(Mnov11,augment(Mnov25,Mdec6)))

Temp2 := (augment(Mjan27,augment(Mfeb18,TotalMass)))

WRITEPRN(mass_sum) := augment(Temp1,Temp2)

SUMMARY

$$\text{TotalMass} = \begin{bmatrix} 158.69 \\ 0.16 \\ 1.44 \\ 0.64 \\ 0.34 \\ 0.15 \\ 0.22 \\ 112.58 \\ 0.26 \\ 84.63 \\ 2.38 \\ 0 \\ 0.42 \\ 85.9 \\ 404.21 \\ 0.12 \\ 1.72 \end{bmatrix} \cdot \text{kg}$$

METAL (kg)

Aluminum
Arsenic
Barium
Boron
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Maganese
Mercury
Nickel
Potassium
Sodium
Vanadium
Zinc

$$\text{TotalMass} = \begin{bmatrix} 349.86 \\ 0.35 \\ 3.17 \\ 1.4 \\ 0.76 \\ 0.33 \\ 0.49 \\ 248.2 \\ 0.58 \\ 186.59 \\ 5.24 \\ 0.01 \\ 0.92 \\ 189.38 \\ 891.14 \\ 0.26 \\ 3.8 \end{bmatrix} \cdot \text{lb}$$

METAL (lb)

Aluminum
Arsenic
Barium
Boron
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Maganese
Mercury
Nickel
Potassium
Sodium
Vanadium
Zinc

SOUTH TACOMA FIELD
RUNOFF MASS
SUMMARY

11-May-92
K/J 916055.10
MASS_SUM.WQ1

METAL	STARTING DATE OF RUNOFF EVENT 01-Apr-92 (kg)	11-Nov-91 (kg)	25-Nov-91 (kg)	06-Dec-91 (kg)	27-Jan-92 (kg)	18-Feb-92 (kg)	TOTAL OF EVENTS (kg)
ALUMINUM	130.39	0.72	1.41	2.22	18.87	5.09	158.69
ARSENIC	0.13	0.00	0.00	0.00	0.02	0.00	0.16
BARIUM	1.01	0.01	0.03	0.03	0.29	0.07	1.44
BORON	0.36	0.01	0.07	0.02	0.17	0.02	0.64
CHROMIUM	0.26	0.00	0.00	0.01	0.06	0.02	0.34
COBALT	0.11	0.00	0.00	0.00	0.03	0.01	0.15
COPPER	0.08	0.00	0.02	0.01	0.10	0.02	0.22
IRON	84.24	0.61	1.74	1.89	19.24	4.86	112.58
LEAD	0.15	0.00	0.01	0.01	0.04	0.04	0.26
MAGNESIUM	39.70	0.75	2.94	2.32	30.17	8.76	84.63
MAGANESE	1.70	0.01	0.05	0.04	0.48	0.10	2.38
MERCURY	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NICKEL	0.22	0.00	0.01	0.01	0.15	0.02	0.42
POTASSIUM	36.47	0.80	3.92	2.48	34.52	7.70	85.90
SODIUM	67.46	5.00	24.53	15.39	240.49	51.35	404.21
VANADIUM	0.05	0.00	0.00	0.00	0.04	0.02	0.12
ZINC	0.72	0.02	0.07	0.05	0.71	0.16	1.72

METAL	STARTING DATE OF RUNOFF EVENT 01-Apr-92 (lb)	11-Nov-91 (lb)	25-Nov-91 (lb)	06-Dec-91 (lb)	27-Jan-92 (lb)	18-Feb-92 (lb)	TOTAL OF EVENTS (lb)
ALUMINUM	286.86	1.58	3.09	4.88	41.51	11.20	349.13
ARSENIC	0.28	0.00	0.01	0.01	0.05	0.01	0.35
BARIUM	2.22	0.02	0.06	0.06	0.65	0.16	3.16
BORON	0.79	0.01	0.15	0.04	0.37	0.04	1.40
CHROMIUM	0.57	0.00	0.01	0.01	0.13	0.04	0.76
COBALT	0.24	0.00	0.01	0.01	0.06	0.02	0.33
COPPER	0.17	0.01	0.03	0.02	0.22	0.05	0.49
IRON	185.33	1.35	3.82	4.16	42.33	10.69	247.68
LEAD	0.33	0.01	0.03	0.02	0.09	0.10	0.58
MAGNESIUM	87.34	1.65	6.46	5.10	66.38	19.27	186.19
MAGANESE	3.73	0.03	0.10	0.09	1.06	0.21	5.23
MERCURY	0.00	0.00	0.00	0.00	0.00	0.00	0.01
NICKEL	0.48	0.01	0.03	0.02	0.34	0.04	0.91
POTASSIUM	80.24	1.77	8.63	5.45	75.95	16.95	188.98
SODIUM	148.40	10.99	53.97	33.85	529.08	112.98	889.27
VANADIUM	0.12	0.00	0.01	0.01	0.09	0.04	0.26
ZINC	1.59	0.04	0.15	0.11	1.57	0.34	3.79

APPENDIX SW-F

ANALYTICAL RESULTS FOR GRAIN SIZE DISTRIBUTION AND TOTAL ORGANIC MATTER

APPENDIX F

RESULTS OF PERCENT GRAIN SIZE AND TOTAL ORGANIC MATTER ANALYSES

Sediment samples collected during the dry and wet season events were analyzed for percent grain size. Sediment samples collected during the wet season were also analyzed for total organic matter (TOM). Grain size and TOM analyses were performed to obtain data related to the physical characteristics of onsite sediment. Results of grain size analysis are presented in Table SW-F1; these results (i.e., silt plus clay fraction) were used to normalize dry weight concentrations of inorganic analytes detected in sediment samples (see Section 5.1).

Results of the TOM analysis are presented in Table SW-F2. TOM ranged from 0.44 percent at Location 2501 to 23.3 percent at Location 2502. Generally, the percentages of TOM were highest in Reach A, however, the lowest percentage was detected in a sample collected in Reach A. Surface water runon discharges to the channel at Location 2501, and it is likely that high water velocities agitate channel sediment at that location and prevent settling of particles in runon and resuspended sediment in the channel.

Except at three sampling locations in Reach B (Locations 2521, 2525, and 2526), TOM percentages were relatively uniform, ranging from 4.5 to 7.6 percent. The percentages of TOM at Location 2526 was similar to that measured in Reach A, but TOM was 0.7 percent at Location 2525, which was significantly lower than the TOM percentages measured at locations upchannel and downchannel.

The percentages of TOM in Reach C were highly variable, ranging from 2.1 percent at Location 2509 to 22.8 percent at Location 2508.

In Reach D, TOM ranged from 3.1 percent at Location 2513 to 10.4 percent at Location 2515, with an apparent trend of increasing TOM with distance toward the site boundary.

TABLE SW-F1

GRAIN SIZE ANALYTICAL RESULTS FOR SEDIMENT SAMPLES

Location Number	Dry Season Event (August 1991)				Wet Season Event (January 1992)			
	% Sand	% Silt	% Clay	% Fine[a]	% Sand	% Silt	% Clay	% Fine[a]
2501	96	3	1	4	96	2	2	4
2502	50	48	2	50	64	36	0	36
2503	66	33	1	34	70	30	0	30
2504	77	20	3	23	73	24	3	27
2505	50	40	10	50	NS[b]	NS	NS	NS
2506[c]	56.5	39.5	4	43.5	61	35	4	39
2507	73	26	1	27	90	8	2	10
2508	70	27	3	30	70	28	2	30
2509[d]	69	27	4	31	72	27	1	28
2510	86	10	4	14	64	34	2	36
2511[d]	38.5	54	7.5	61.5	68	31	1	32
2512	43	50	7	57	66	34	0	34
2513	86	12	2	14	90	10	0	10
2514	78	18	4	22	74	26	0	26
2515	86	10	4	14	78	22	0	22
2516[d]	91	7.5	1.5	9	90	8	2	10
2518	77	20	3	23	70	30	0	30
2519	60	36	4	40	70	30	0	30
2520	60	33	7	40	72	28	0	28
2521	55	35	10	45	72	28	0	28
2522	77	20	3	23	82	18	0	18
2423	76	20	4	24	82	18	0	18
2524	60	33	7	40	78	22	0	22
2525	48	51	1	52	92	6	2	8
2526	44	55	1	56	72	28	0	28
2527	66	31	3	34	70	30	0	30
2528	35	64	1	65	48	52	0	52
2529	50	48	2	50	58	42	0	42
2530	82	16	2	18	80	20	0	20

(a) % Fine = % Clay + % Silt.
(b) NS = No sample collected.
(c) Average values for two samples collected at location 2506 during dry season only.
(d) Average values for two samples collected during dry and wet seasons.

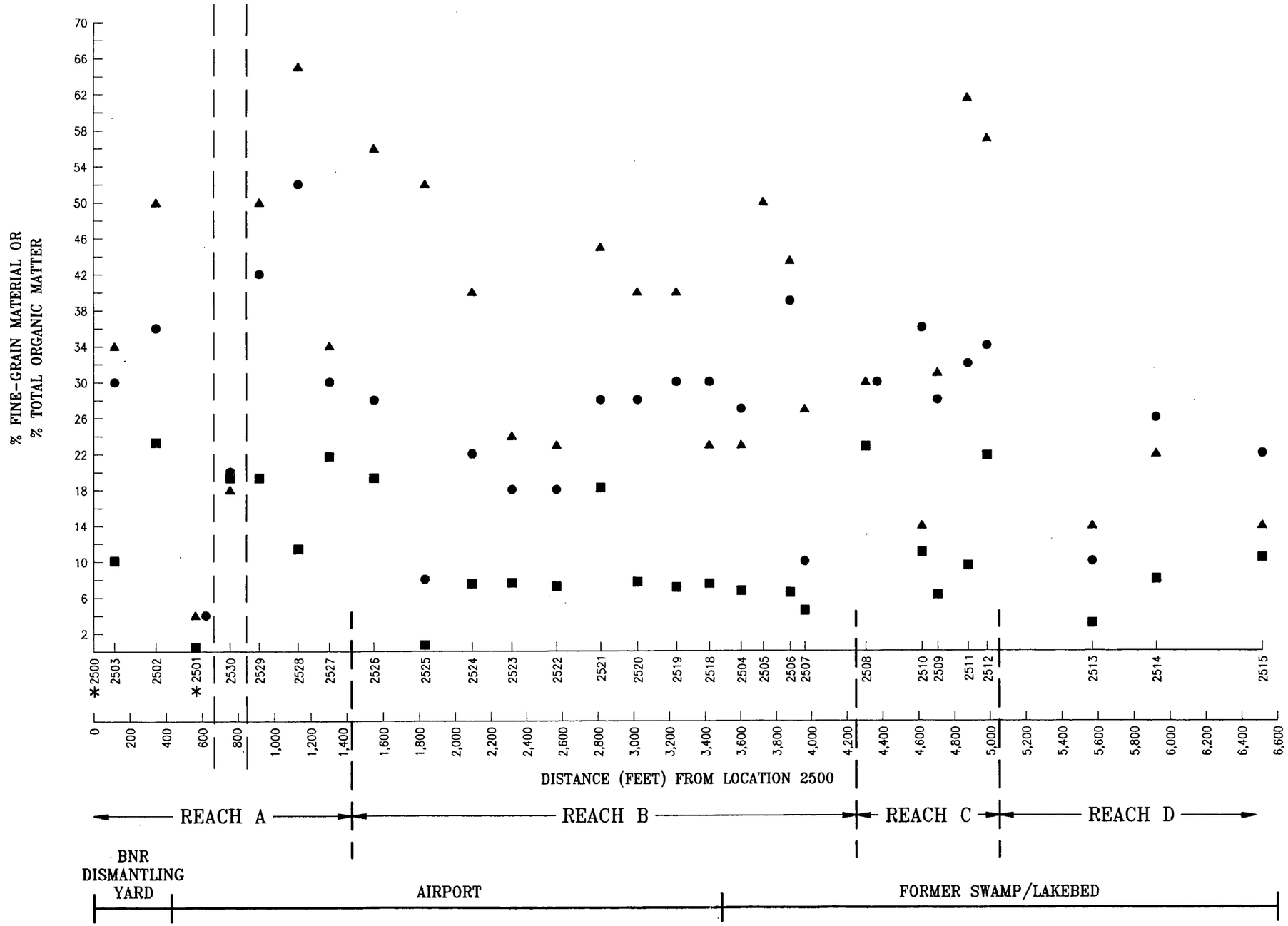
TABLE SW-F2

TOTAL ORGANIC MATTER ANALYTICAL RESULTS FOR SEDIMENT SAMPLES COLLECTED DURING WET SEASON[a]

Location Number	Reach (see Figure SW-5)	Total Organic Matter (%)
2501	A	0.44
2502	A	23.3
2503	A	10.1
2527	A	21.7
2528	A	11.4
2529	A	19.3
2530	A	19.3
2504	B	6.7
2505	B	NS[b]
2506	B	6.5
2507	B	4.5
2518	B	7.5
2519	B	7.1
2520	B	7.7
2521	B	18.2
2522	B	7.2
2523	B	7.6
2524	B	7.5
2525	B	0.70
2526	B	19.3
2508	C	22.8
2509	C	2.1/10.4[c]
2510	C	11.0
2511	C	3.0/16.0[c]
2512	C	21.8
2513	D	3.1
2514	D	8.0
2515	D	10.4
2516	NA[d]	2.27/0.44[c]

(a) Only sediment samples collected during the wet season (January 1992) event were analyzed for total organic matter (TOM) using USDA Handbook No. 60, Method 24.
(b) NS = No sample collected.
(c) Two samples were collected at one location.
(d) NA = Not applicable (Location 2516 is outside of surface water channel).

SEDIMENT



N

LEGEND

- ■ % TOTAL ORGANIC MATTER (WET SEASON)
- ▲ % FINE-GRAIN MATERIAL (DRY SEASON)
- ● % FINE-GRAIN MATERIAL (WET SEASON)
- * SURFACE WATER RUNON LOCATION

NOTE:

DRY SEASON SEDIMENT SAMPLES WERE NOT ANALYZED FOR TOTAL ORGANIC MATTER.

Kennedy/Jenks Consultants

SOUTH TACOMA FIELD
TACOMA, WA

PERCENT FINE-GRAIN MATERIAL AND PERCENT TOTAL ORGANIC MATTER IN SEDIMENT

916055.24/P2SK063

FIGURE SW-F1

SURFACE WATER AND SEDIMENT INVESTIGATION
DATA APPENDIX

(bound separately)